Expanded Site Inspection
Final Report

Cottage Grove Landfill
Chicago, Illinois
ILD 980 497 747

December 29, 1994

Prepared for:
U.S. Environmental Protection Agency
under Alternative Remedial Contracting Strategy
Contract 68-W8-0064, Work Assignment 33-5JZZ
ARCS Contractor Project 71280.104

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1.0 Introduction

On February 4, 1993, the Alternative Remedial Contracting Strategy (ARCS) contractor was authorized, by approval of the work plan amendment by the U.S. Environmental Protection Agency (USEPA) Region V, to conduct an expanded site inspection (ESI) of the Cottage Grove Landfill site in Cook County, Illinois.

The site was initially placed on the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) on April 1, 1979, as a result of a request for discovery action initiated by the USEPA.

The facility received its initial Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) evaluation in the form of a preliminary assessment (PA) report completed by the Illinois Environmental Protection Agency (IEPA) on January 25, 1984. IEPA also completed a site inspection (SI) report on December 3, 1984. A field inspection team (FIT) contractor completed a PA reassessment report on October 31, 1991. The sampling portion of the ESI was conducted on August 17 and 18, 1993, when a field team collected six sediment, five surface water, eight soil, and three groundwater samples.

The purposes of the ESI have been stated by USEPA in a directive outlining site inspection performed under CERCLA. The directive states:

> The objective of the expanded SI is to provide documentation for the HRS package to support National Priority List (NPL) rule making. Remaining HRS information requirements are addressed and site hypotheses not completely supported during previous investigations are evaluated. Expanded SI sampling is designed to satisfy HRS data requirements by documenting observed releases, observed contamination, and levels of actual contamination at targets. In addition, investigators collect remaining non-sampling information. Sampling during the expanded SI includes background and quality assurance/quality control samples to fully document releases and attribute them to the site. Following the expanded SI, USEPA site assessment managers assign the site a priority for HRS package preparation and proposal to the NPL.

USEPA Region V requested identification of sites during the ESI that may require removal action to remediate an immediate human health or environmental threat. No removal action requirements were identified while conducting field activities at the Cottage Grove Landfill site.

2.0 Site Background

2.1 Introduction

This section includes information obtained during the ESI and from reports of previous site activities.

2.2 Site Description

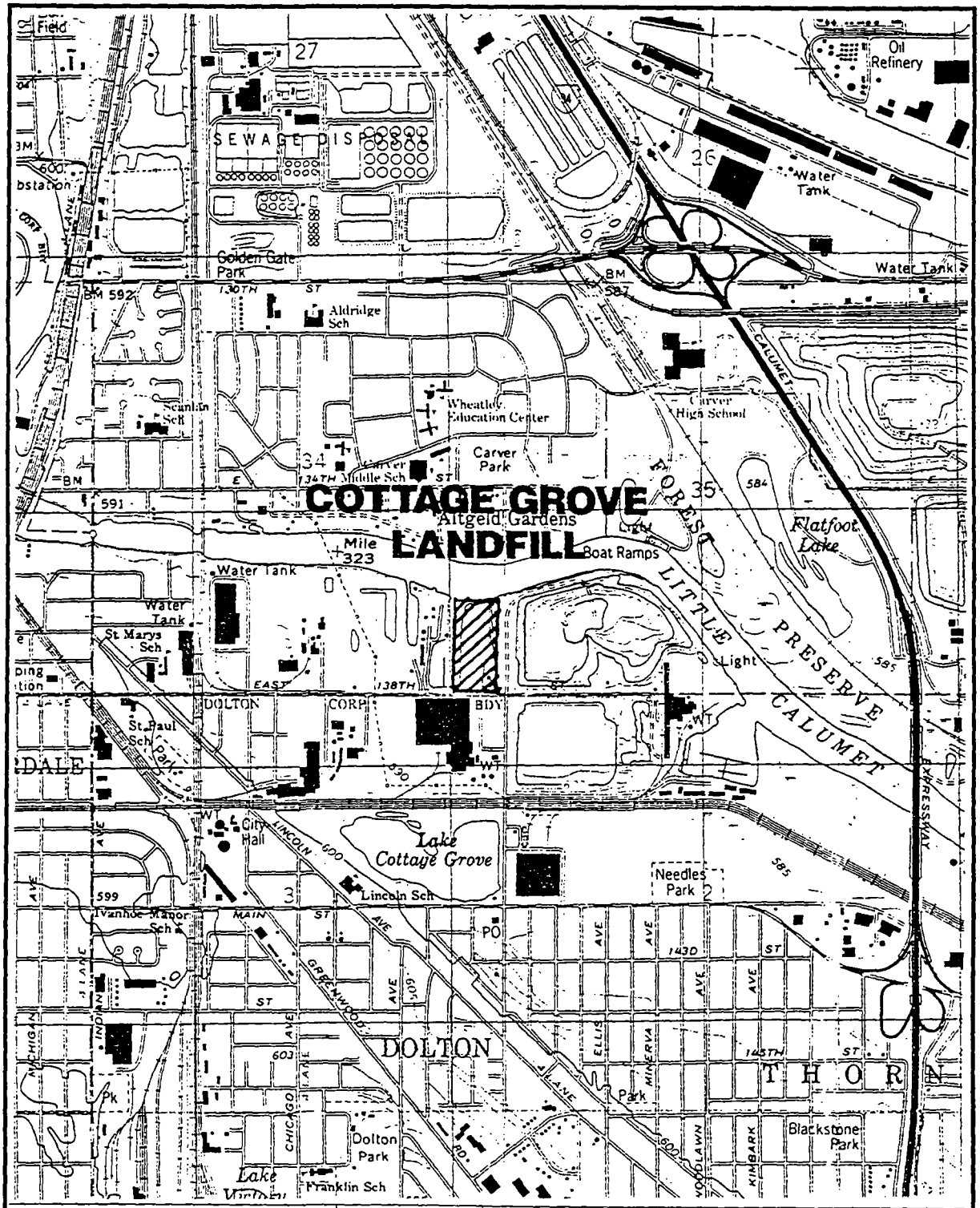
The Cottage Grove Landfill site contains an inactive landfill that covers about 14 acres on an 18-acre property in Chicago, Illinois. The site is south of the Little Calumet River, approximately one mile west of the Calumet Expressway (Interstate 94), at the northwestern intersection of 138th Street and Cottage Grove Avenue. The site borders are the Little Calumet River to the north, the Land and Lakes No. 2 Landfill to the east, an industrial complex to the south, and a harbor with a marina used for recreational boating to the west. An onsite pond covers an area about two acres in size in the northeastern quadrant of the site. Also, a residential unit is onsite, near the southeastern corner of the fill area, by the landfill entrance. The site is in the southeastern quarter of Section 34, Township 37 North, Range 14 East of the Third Principal Meridian (USGS 1991a). Figure 2-1 is a site location map. Figure 2-2 is a site sketch.

Within four miles of the Cottage Grove Landfill, land use is a combination of recreational, industrial, and residential. Appendix A contains a 4-Mile Radius Map and a 15-Mile Downstream Map.

The Cottage Grove Landfill has no engineered liner or leachate collection system.

2.3 Site History

The Cottage Grove Landfill operated from 1976 to 1982. The facility had a history of poor operating practices and was cited on numerous occasions by the Illinois Environmental Protection Agency (IEPA) for improper daily and final cover. The site was also cited for accepting hazardous waste, which was not authorized under the facility's permit. Approximately eight acres of the facility were covered with lagoon sludge, that contains heavy metals, to support a vegetative base for erosion control. Disposal of the unpermitted lagoon sludge from the Metropolitan Sanitary District of Greater Chicago (MSDGC) began in 1980, continued after site closure in 1982, and ceased in 1983. Approximately 136,092 dry tons of sludge



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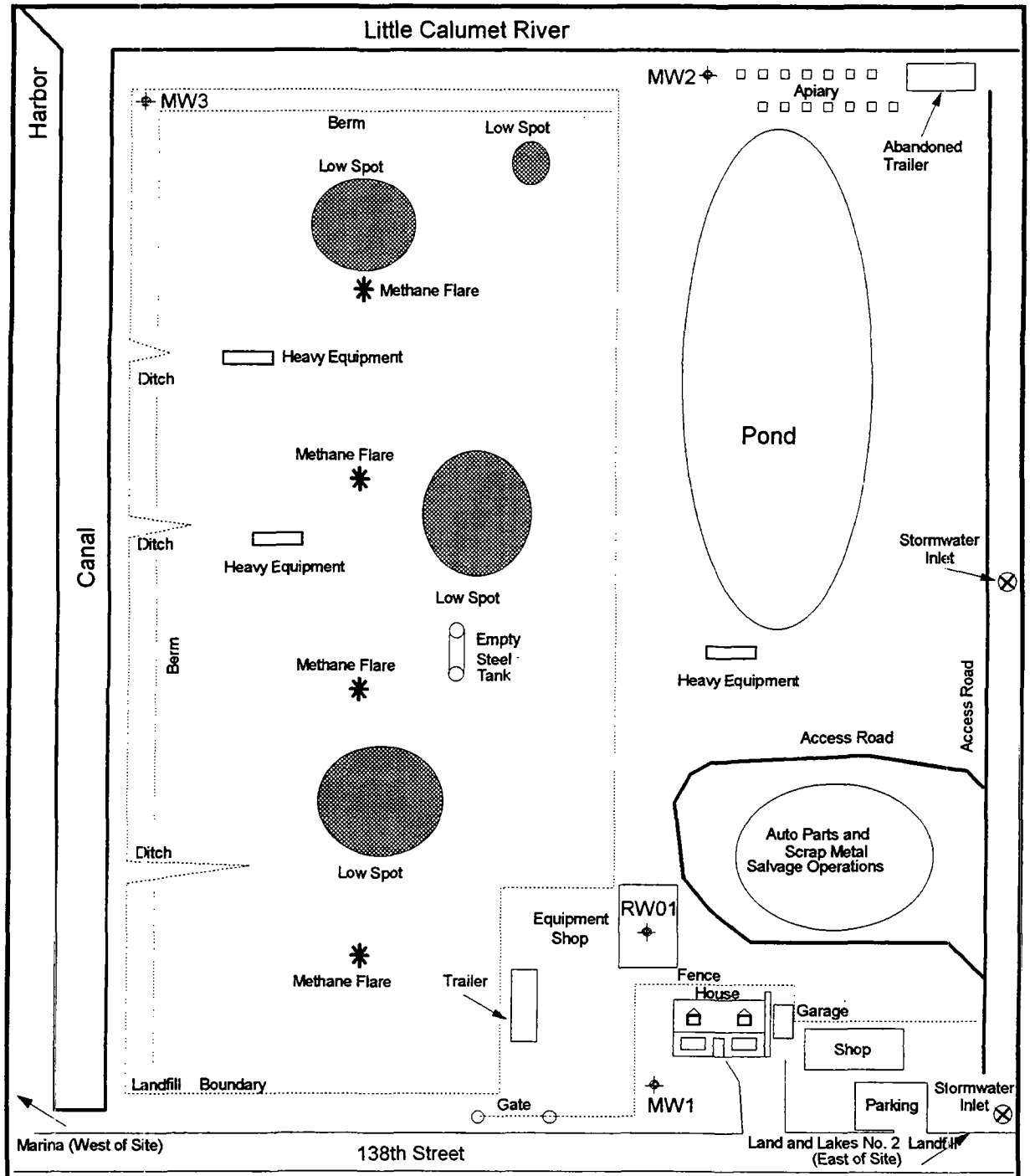

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Figure 2 - 2
Site Sketch

Cottage Grove Landfill
Chicago, Illinois

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reportedly was disposed of at the site (MSDGC 1987). In a letter to Ecology and Environment, Inc. (E&E), dated January 14, 1987, MSDGC presented analytical data that indicates a range of concentrations of several heavy metals contained in three types of sludge. The sludge shipments reportedly consisted of 46,688 dry tons of "Nu Earth Sludge" (chemically treated), 57,536 dry tons of wet lagoon sludge, and 31,868 dry tons of shredded and unshredded air dried lagoon sludge (MSDGC 1987). A summary of the heavy metals and range of concentrations contained in these sludges follows:

- Mercury (1,400 - 16,000 μg/kg).
- Lead (154 - 3,390 mg/kg).
- Chromium (438 - 4,940 mg/kg).
- Cadmium (37 - 576 mg/kg).

According to IEPA and USEPA files, inadequate capping of the landfill after closure caused slope erosion and leachate production. Between March 15 and October 26, 1982, an additional layer of clay cover was added to the northern, eastern, and western slopes to strengthen eroded areas. The thickness of the additional clay cover is unknown. During a drive-by inspection on June 12, 1991, FIT personnel observed erosion of the landfill cover, resulting in exposed debris. Facility access is unrestricted because of inadequate fencing.

IEPA and FIT contractor documentation indicates that the facility has had observed leachate releases. IEPA and USEPA file information indicates that the landfill has had stability and erosion problems, which resulted in discharge of leachate and exposed wastes. On May 7, 1982, IEPA personnel documented that leachate was discharged from seeps in the fill slope and collected in three water filled trenches on the eastern side of the site. Leachate seeps and stains were observed on the slope and between the trenches (USEPA 1984).

2.3.1 Operational History

Reportedly, the owner acquired the land around 1946 from a doctor and his family, who farmed on the property. It has also been reported that in 1976, the present owner began landfilling activities onsite, accepting municipal, industrial, and commercial solid waste (i.e., household and demolition waste).

In 1976, the facility was permitted by the state as a sanitary landfill; it was not permitted to accept special waste. The facility has no engineered liner or leachate collection system (E&E 1991). IEPA and FIT contractor personnel observed onsite

leachate seeps during site inspections before and after facility closure. A potential exists for leachate seep through the side slopes and bottom of the landfill and discharge to the surface water or groundwater pathways (USEPA 1984). Little information is available on the specific type and quantity of solid waste disposed of in the landfill. The landfill has been cited for poor management practices and allegedly for accepting hazardous waste substances in violation of permit provisions.

IEPA cited the facility on numerous occasions for the following violations (Circuit Court of Cook County 1986):

- Inadequate daily cover of waste.
- Disposal of solid waste in areas not allowed by the operating permit.
- Exposure/inadequate final cover of waste deposited in final lifts.
- Failure to maintain the final elevations of completed portions of the site below the 30-foot height limit, and failure to maintain the proper horizontal to vertical ratio in the slope of the working face of the landfill, as required by the facility's permit.
- Violations of quarterly groundwater monitoring and reporting requirements.
- Other violations include failure to collect and properly dispose of litter at the site, waste deposits at the top of landfill slope instead of in the toe or bottom of trenches; and the onsite stockpiling and scavenging of unpermitted materials onsite such as scrap metal, tires, wood and fabric pieces.

In addition to the landfill operations conducted at the facility, unpermitted vehicle and heavy equipment salvage operations have been conducted adjacent to and on the landfill portion of the property.

2.3.2 Summary of Onsite Environmental Work

On March 15, 1982, IEPA conducted an onsite inspection and samples were collected from the two onsite groundwater monitoring wells. The results indicated several contaminants at elevated levels, including boron, fluoride, ammonia, copper, iron, manganese, phenolics, phosphorous, and sulfate.

On May 7, 1982, IEPA conducted an onsite inspection and collected samples from an onsite leachate pond. The results indicate contaminants similar to those identified in the groundwater samples.

IEPA completed a PA report on the site, including USEPA Form 2070-12, dated January 25, 1984. The report indicated that the site accepted several loads of dry municipal sewage sludge after closure. The report stated that a potential exists for leachate seeps through the side slopes and bottom of the landfill, indicating a potential for surface or groundwater contamination. The report also summarized two previous sampling events.

The PA report also made reference to the history of poor operating practices and the lack of verification for the depth of the final cover. The report recommended further investigation of environmental impact and assigned a medium priority for inspection.

FIT personnel conducted an SI on December 3, 1984. It indicates that IEPA tried to close the landfill, and that the Attorney General's office was involved with the legal process. Onsite salvage operations were observed. The SI report notes the use of recycled municipal sewage sludge as a vegetative cover and that leachate seeps were observed onsite. It also states primary concern at the site was the potential for contamination of surface soils and surface water, with the threat to residential areas within three miles of the site. The potential for contaminants to seep or leach from the facility to groundwater and the Little Calumet River was also identified as a concern. The site was assigned a medium priority.

As a result of a 1986 court order against the owner/operator of the Cottage Grove Landfill, some onsite improvements were implemented. Four methane flares with burners were installed. These flares release, incinerate, and monitor landfill gases. Although two feet of final clay cover was ordered, the extent and depth of coverage are unknown.

During operation, the landfill had two monitoring wells. These wells were accidentally covered or abandoned. Three new monitoring wells were installed to comply with the 1986 court order.

Some limited slope stability work was also accomplished to grade slopes to the proper horizontal to vertical ratio. In addition to the slope grading work, according to the owner, earth berms were constructed along the western and northern landfill perimeter to prevent channeling runoff from going directly into the Little Calumet River and to reduce erosion caused by runoff discharging to the river.

2.4 Applicability of Other Statutes

No record of Resource Conservation and Recovery Act (RCRA) activity concerning the site has been found. In February 1986, the state filed suit against Cottage Grove Landfill, Inc., Beverly Bank, as trustee; and Mr. Louis D. Meneghin, the owner. The suit ordered several final closure requirements, post closure monitoring requirements, and a $10,000 fine.

3.0 Site Inspection Activities and Analytical Results

3.1 Introduction

This section outlines the observations of site conditions and operations, sampling activities, and analytical results from the ESI conducted at the Cottage Grove Landfill site. Sampling activities were conducted in accordance with the USEPA approved quality assurance project plan (QAPjP) dated September 27, 1991.

ESI samples were analyzed for organic and inorganic substances contained on the USEPA Target Compound List (TCL) and Target Analyte List (TAL) by USEPA Contract Laboratory Program (CLP) participant laboratories. Appendix B presents the TCL and TAL. Appendix C presents a summary of analytical data generated by ESI sampling. Appendix D contains site photographs and a sketch that shows the location and direction of each photograph along with general sample locations. Figures 3-1 and 3-2 show each sampling location. Table 3-1 summarizes sample descriptions and locations.

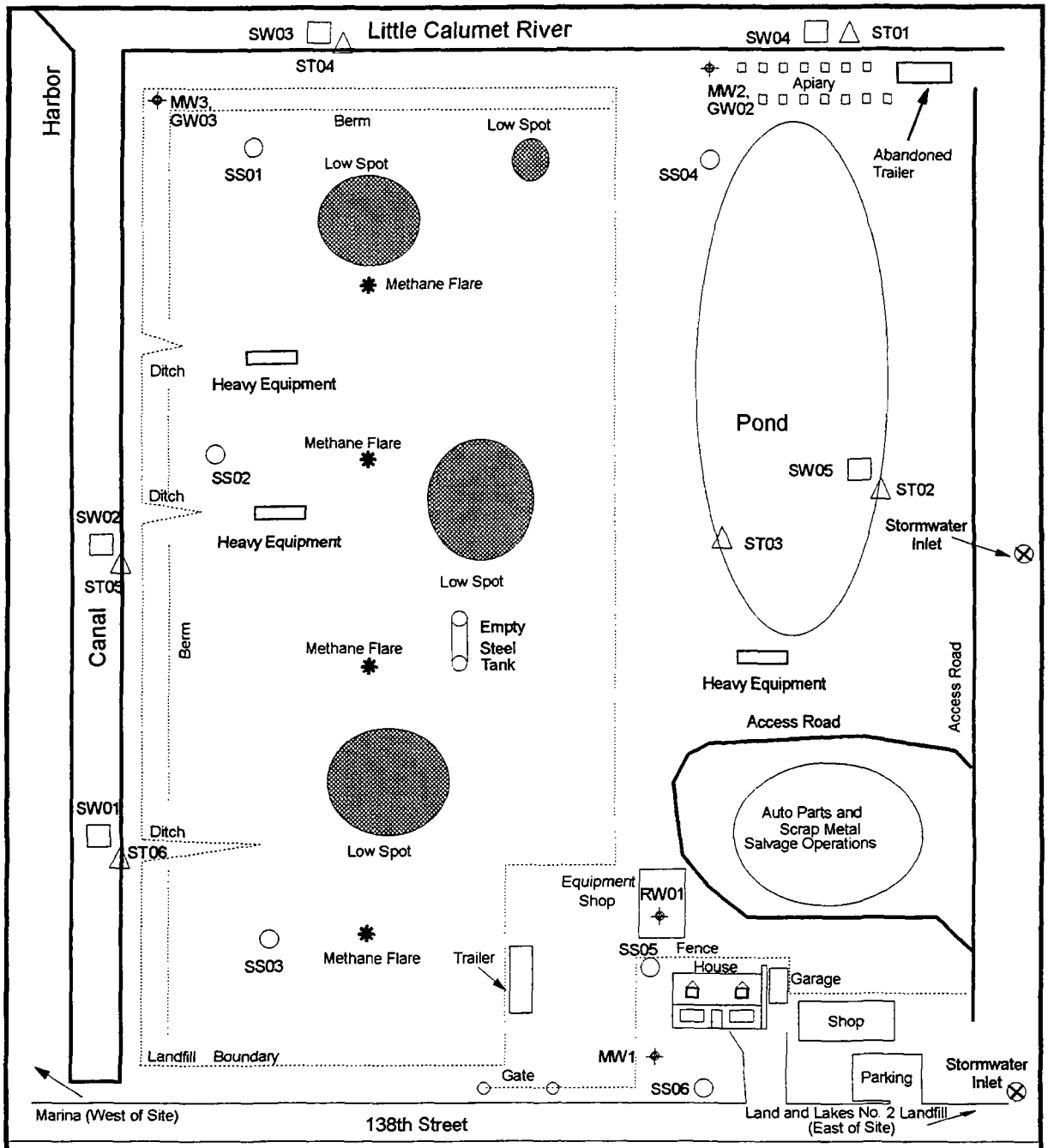
Sample activities were conducted in accordance with procedures set forth in the QAPjP. No split samples were collected. Sample jars were sealed, labeled, packaged, and transported to USEPA CLP participant laboratories. Table 3-2 identifies the applicable laboratories, according to media sampled, and the category of analysis performed.

Reusable sampling and personal protective equipment (PPE) were decontaminated before transport offsite. Disposable sampling and PPE items were discarded in accordance with procedures outlined in the ESI project work plan and the QAPjP.

3.2 Site Reconnaissance

On April 28, 1993, a reconnaissance of the Cottage Grove Landfill site was conducted. This visit included a visual site inspection of the property to determine the status, facility activities, health or safety hazards, and potential sampling locations.

The reconnaissance began with an interview with the site owner, Mr. Louis Meneghin, Sr. During the interview, a site walk-through was conducted; photographs were taken; and potential sampling locations, including three monitoring wells and an onsite residential well, were identified.



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Reconnaissance Inspection
April 1993

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Figure 3 - 1
Sample Locations

Cottage Grove Landfill
Chicago, Illinois

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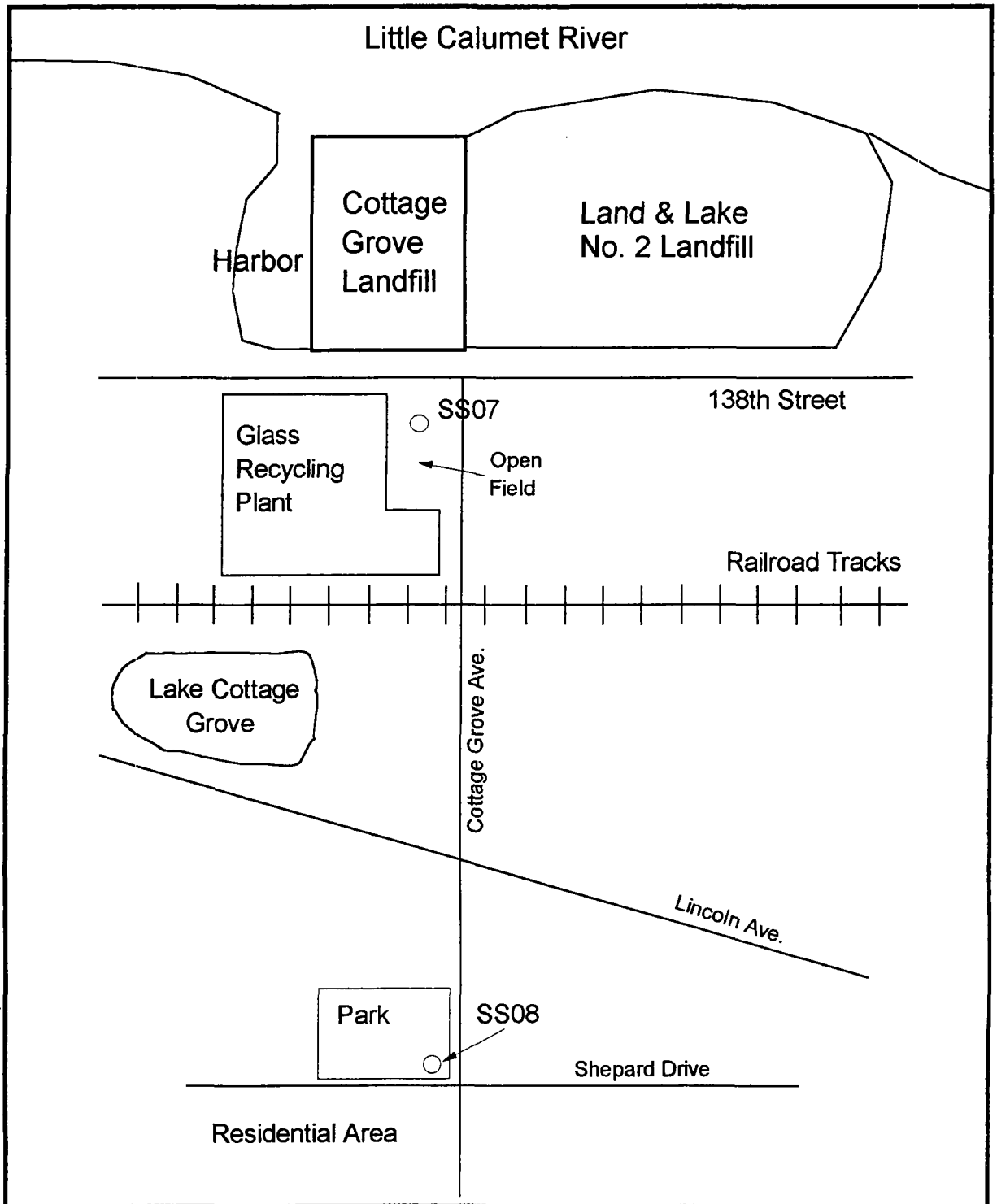

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Table 3-1
Sample Descriptions

* Sample No.	Depth (Inches)	Appearance	Location
SS01	8 to 12	Dry dark gray sandy clay	On the bottom of the northern slope of the landfill, approximately 60 feet directly southeast of an onsite monitoring well (MW3), located at northwestern corner of the site.
SS02	6 to 10	Dry tannish gray gravely clay	In the midsection of the top of the landfill, approximately 180 feet west of the second methane flare from the northern end of facility.
SS03	6 to 8	Dry dark brown silty clay	On top of the southern portion of the landfill, approximately 50 feet west of the southernmost methane flare.
SS04	6 to 12	Dark brown sandy topsoil with some organic matter, slightly moist	Near the northwestern corner of the onsite pond, approximately 50 feet south of an onsite monitoring well (MW2), located at the northeastern corner of the landfill.
SS05	4 to 6	Dry dark brown sandy topsoil	Back yard of onsite residence, approximately 30 feet north of the northwestern corner of the onsite house.
SS06	4 to 6	Dry dark gray sandy topsoil	Front yard of onsite residence, about 35 feet south of the home's front door (southern side of building).
SS07	4 to 6	Dry dark brown sandy topsoil	Background sample--South of 138th Street, across the street from the onsite residence, in an open field near the fence of a glass recycling plant; about 55 feet south of 138th Street and 65 feet west of Cottage Grove Avenue.
SS08	6 to 8	Dry dark brown sandy topsoil	Background sample--In a residential area about one mile south of the site, near the base of a tree in a park at the northwestern intersection of Cottage Grove Avenue and Shepard Drive.

Table 3-1 (Continued) Sample Descriptions			
Sample No.	Depth (Inches)	Appearance	Location
SW01	0 to 6	Clear	Just off the eastern bank of the harbor west of the landfill, approximately 100 feet north of the southern end of the harbor.
SW02	0 to 6	Clear	Just off the eastern bank of the harbor west of the landfill, approximately 450 feet north of the southern end of the harbor.
SW03	0 to 6	Clear	Just off the southern bank of the Little Calumet River, just north of the onsite monitoring well (MW3) located near the northwestern corner of the landfill.
SW04	0 to 6	Clear	Background sample--Off the southern bank of the Little Calumet River, just east of the onsite apiary and about 30 feet west of the stormwater culvert that runs along the western border of the Land and Lakes No. 2 Landfill.
SW05	0 to 6	Clear	Just off the eastern bank of onsite pond, approximately 220 feet north of the southern end of the pond.
ST01	0 to 6	Gray clay with sand, gravel, and pieces of brick	Background sample--Off the southern bank of the Little Calumet River, just east of the onsite apiary and about 30 feet west of the stormwater culvert that runs along the western border of the Land and Lakes No. 2 Landfill.
ST02	0 to 6	Dark gray to black silty clay with organic matter	Just off the eastern bank of onsite pond, approximately 220 feet north of the southern end of the pond.

Table 3-1 (Continued) Sample Descriptions			
Sample No.	Depth (Inches)	Appearance	Location
ST03	0 to 6	Black organic muck with some clay	Just off the western bank of the onsite pond, approximately 175 feet north of the southern end of the pond.
ST04	0 to 6	Dark gray clay with sand and organic matter	Just off the southern bank of the Little Calumet River, north of the onsite monitoring well MW3 located near the northwestern corner of the landfill.
ST05	0 to 6	Dark gray clay with sand and organic matter	Just off the eastern bank of the harbor west of the landfill, about 450 feet north of the southern end of harbor.
ST06	0 to 6	Dark gray clay with sand, gravel, and organic matter	Just off the east bank of the harbor west of the landfill, approximately 100 feet north of the south end of the harbor.
RW01	Unknown About 200ft.	Clear	Private well located in a sheet-metal building, north of the onsite residence.
GW01	Not Sampled	Not Applicable	MW1 was not sampled because monitoring equipment indicated possible explosion hazard.
GW02	25ft.**	Cloudy, light brown	Background sample--Monitoring well MW2, located at the northeastern corner of the landfill, just west of the onsite apiary.
GW03	26.9ft.**	Bubbly/cloudy, light grayish tint	Monitoring well MW3, located at the northwestern corner of the landfill.

* Sample Numbers are made up of four alpha numerics (two letters followed by two numbers). The two letters designate the type of media sampled and the two numbers designate the different sample locations for each media. SS, SW, ST, RW, and GW designate soil, surface water, sediment, residential well, and groundwater samples.

** Depth (the distance from top of the well riser to the groundwater).

Table 3-2 Laboratory Information		
Media	Analyses	Laboratory
Surface Water and Sediment	Organic	IT Analytical Services Cerritos, California
	Inorganic	ITMO - St. Louis Laboratory Earth City, Missouri
Soil and Groundwater (Monitoring Wells)	Organic	Natex/Gulf South Environmental Laboratory New Orleans, Louisiana
	Inorganic	Southwest Laboratory of Oklahoma Broken Arrow, Oklahoma
Residential Well	Organic	Envirosystems, Inc. Columbia, Maryland
	Inorganic	ETS Analytical Services Roanoke, Virginia

According to the site owner, during the late 1980s, earth berming work was done along the western and northern site perimeter to improve slope stability and reduce offsite drainage. Some runoff along the eastern perimeter drains into a stormwater culvert that runs north, from the southeastern corner of the facility, to the Little Calumet River. The culvert is located along the eastern site border, between Cottage Grove Landfill and neighboring Land and Lakes No. 2 Landfill. It is believed that the inlets and culvert were designed to direct stormwater to the Little Calumet River. Erosion of the northernmost inlet (halfway between 138th Street and the Little Calumet River) was observed. The southernmost inlet (southeastern site corner, along 138th Street) is approximately six to eight inches above grade, with a two-foot high soil embankment that diverts runoff from the southwestern corner of Land and Lakes No. 2 Landfill away from the inlet and onto the Cottage Grove property. According to Mr. Meneghin, inadequate drainage between the two properties recently caused runoff from the Land and Lakes facility to flood the lower sections of the Cottage Grove property along the eastern border.

Although no visible evidence of current onsite leachate problems, hazardous wastes, or hazardous materials was observed during the reconnaissance visit, a possible leachate seep stain was identified near the top of the southern half of the western slope of the landfill. The stain was rust colored and could have been from a rusting piece of scrap metal, machinery, or an automotive part. Numerous junked vehicles, heavy equipment, and vehicle parts are stored onsite. Most of these discarded items are in the southeastern quadrant of the site; however, some items, including an empty steel tank, are located on top of the landfill.

The facility appears to be adequately covered (no visible wastes) with heavy vegetation (grass and small trees) throughout most of the site; however, the thickness of the cover across the landfill is unknown. Four gas vents are spaced evenly along the center (north-south) of the fill area. IEPA mandated installation of three new monitoring wells; two original monitoring wells reportedly were covered or damaged. According to Mr. Meneghin, the new wells were installed in 1991 and are between 30 and 40 feet deep. Figure 2-2 shows the approximate monitoring well locations.

The facility is inadequately fenced to restrict public access. Anyone on foot could walk up the southern landfill slope from the northern shoulder of 138th Street.

A house is at the southern site perimeter, within 200 feet of the landfill. The property caretaker lives in the house with his family. North of the house, a private well is located in a sheet-metal building, which is used as a garage. The well reportedly is about 200 feet deep, and the water is not used for drinking. Mr. Meneghin indicated water from the well is used only for bathing and washing clothes, and the occupants of the house use bottled drinking water.

3.3 Site Representative Interview

The site reconnaissance and interview were conducted on April 28, 1993. The site owner, Mr. Louis Meneghin Sr., was interviewed. The interview began at the southeastern portion of the site, near the driveway to the onsite private residence. The interview continued while the site tour was conducted.

Mr. Meneghin acquired the 18-acre property around 1946. The landfill covers approximately 14 acres of the property. Mr. Meneghin indicated the land previously belonged to a doctor and his wife, who farmed on the property. Mr. Meneghin also used the land for farming until 1976, when sanitary landfill operations began at the site.

Mr. Meneghin confirmed that sludge received from the Metropolitan Sanitary District (MSD) of Greater Chicago between 1980 and 1983 was spread over several acres of the landfill to support a vegetative cover. Mr. Meneghin indicated that the site has never had a RCRA permit nor has the facility filed a RCRA Part A permit application. He also stated that hazardous wastes were not accepted at the facility; however, he confirmed that sludge accepted from the MSD contained heavy metals. Mr. Meneghin also stated that no liquid wastes were accepted at the facility.

When questioned about slag being accepted at the facility, Mr. Meneghin indicated that the only slag at the site was used to form a site access road. He said it was "crushed particles, after the iron ore was removed." In an area onsite, just north of the pond, several boxes contain bee hives used to produce honey. It is assumed that the honey is produced for private use by the property caretaker.

3.4 Groundwater Sampling

On August 17, 1993, groundwater samples were collected from two onsite monitoring wells (MW2 and MW3) and from an onsite residential well (RW1). The monitoring wells were purged and sampled using stainless steel bailers, in accordance with the approved ARCS V QAPjP. MW1 was not sampled because of safety concerns over high organic vapor readings and possible explosive or ignitible vapors detected at the well during air monitoring activity. MW2 (GW02) is located at the northeastern corner of the landfill, just west of the onsite honeybee apiary. MW3 (GW03) is located at the northwestern corner of the landfill.

The onsite private well was sampled to assess the potential for both release of hazardous substances and health threats to onsite residents. The private well supplies water to the onsite residence. It is located in a sheet-metal building, north of the house. The well reportedly is screened at approximately 200 feet, and the water is not used for drinking. Occupants of the house verified that the water from the well is used only for bathing and washing clothes; bottled water is used for drinking.

Onsite monitoring wells are screened in the shallow glacial drift aquifer and the residential well reportedly is screened in a lower bedrock aquifer. An hydraulic connection may exist between the shallow glacial drift aquifer and the Silurian dolomite bedrock aquifer; however, the thick clay till likely impedes downward groundwater migration (Andrew Environmental Engineering 1988).

3.5 Sediment and Surface Water Sampling

On August 18, 1993, the ESI field team collected surface water and sediment samples.

3.5.1 Sediment Samples

Seven sediment samples were collected during the ESI sampling effort at the landfill. These environmental samples were collected to determine if the landfill released significant amounts of hazardous substances to adjacent surface water bodies and wetlands. Background sample locations for both surface water and sediment media were selected to account for upstream influence by the neighboring Land and Lakes No. 2 Landfill.

The background sediment sample (ST01) was collected from the northeastern corner of the site on the southern bank of the Little Calumet River. Two samples (ST02 and ST03) were collected from the onsite pond. One sample (ST04) was collected at the northwestern corner of the site on the southern bank of the Little Calumet River. The two remaining samples (ST05 and ST06) were collected at two locations along the eastern bank of the boating harbor, west of the site.

3.5.2 Surface Water Samples

A total of five surface water samples were collected at the site. Two surface water samples (SW01 and SW02) were collected from the boating harbor that is connected to the Little Calumet River on the western side of the landfill. A third sample (SW03) was collected from the Little Calumet River, along the northern site border. A fourth sample (SW05) was collected from the onsite pond. The fifth sample (SW04) was collected as a background sample at the northeastern corner of the site, on the southern bank of the Little Calumet River, upstream of the other river samples, but downstream of the neighboring Land and Lakes No. 2 Landfill.

3.6 Soil Sampling

On August 17, 1993, the ESI field team collected a total of eight soil samples at the site. Soil sample locations were chosen to identify possible contamination resulting from landfill activities and to address exposure concerns to onsite residence. Soil sampling included two samples from the yard of the onsite residential unit. Soil samples were collected at depths of less than 1.0 feet. Concerns exist about the unknown extent and composition of the landfill cover. Environmental concerns also

exist because the site is not completely fenced, a residential unit is onsite, and possible auto parts and scrap metal salvage operations exist onsite.

Three soil samples (SS01, SS02, and SS03) were collected on top of the fill area. One soil sample (SS04) was collected from a spot between the northern segment of the eastern slope of the landfill and the northern portion of the onsite wetland pond. SS05 was collected from the backyard of the residence, and SS06 was collected from the front yard. In addition, two background soil samples (SS07 and SS08) were collected from two undeveloped lots, south of the site. SS07 was collected from an open field on the southern side of 138th Street, near the fence of a glass recycling plant, across the street from the Cottage Grove Landfill. SS08 was collected near the base of a tree at the northwestern quadrant of the intersection of Cottage Grove Avenue and Shepard Drive, in a residential area approximately one mile south of the landfill. Two background soil samples were collected to avoid inadvertently choosing a single sample that could be affected by local industry or some other isolated dumping incident.

3.7 Analytical Results

This section summarizes analytical results from ESI samples. Appendix C presents ESI analytical data.

Onsite pond surface water sample (SW05) contained one inorganic analyte, magnesium (68,400 μg/L) that met observed release criteria. Two downstream surface water samples (SW01 and SW03) were collected in the Little Calumet River. SW01 contained sodium (136,000 μg/L) and SW03 contained chromium (5.6 μg/L). The surface water background location (SW04) was selected at the most upstream point along the site boundary in the Little Calumet River, but downstream of the Land and Lakes No. 2 facility east of the site.

Onsite pond sediment sample (ST03) contained seven semivolatile organic compounds in concentrations meeting observed release criteria, including phenanthrene (8.4 mg/kg), fluoranthene (14.0 mg/kg), pyrene (9.2 mg/kg), benzo(a)anthracene (7.3 mg/kg), chrysene (5.7 mg/kg), benzo(b)fluoranthene (7.2 mg/kg), and benzo(a)pyrene (4.3 mg/kg). If the sediment sample (ST02) collected from the eastern bank of the onsite pond had been used as background, more hazardous substances with elevated concentrations would have been identified that meet observed release criteria.

The sediment background location (ST01) was selected near the most upstream point along the site boundary in the Little Calumet River. Analysis of downstream sediment samples collected in the Little Calumet River (ST04, ST05, and ST06) identified several organic compounds and inorganic analytes. Analysis of sediment sample ST04 identified antimony (12.8 mg/kg) and potassium (2,240 mg/kg). Analysis of sediment sample ST05 detected 4,4'-DDD (0.045 mg/kg), copper (80.1 mg/kg), and potassium (1,420 mg/kg). The analysis of sediment sample ST06 detected potassium (1,170 mg/kg).

Two soil samples (SS05 and SS06) were collected from the yard of the onsite residence. The substances identified at the SS05 location that meet observed release criteria are bis(2-ethylhexyl)phthalate (1.8 mg/kg), beryllium (0.24 mg/kg), manganese (855 mg/kg), and nickel (21.9 mg/kg). The substances identified at the SS06 location that meet observed release criteria are bis(2-ethylhexyl)phthalate (8.2 mg/kg), dieldrin (0.46 mg/kg), beryllium (0.69 mg/kg), chromium (66.1 mg/kg), copper (65.5 mg/kg), manganese (1,070 mg/kg), mercury (0.23 mg/kg), nickel (30.5 mg/kg), potassium (3,200 mg/kg), vanadium (41.6 mg/kg), and cyanide (0.83 mg/kg).

Soil sample (SS04) contained three inorganic analytes that meet observed release criteria: beryllium (0.69 mg/kg), nickel (22.0 mg/kg), and potassium (3,310 mg/kg).

Three soil samples (SS01, SS02, and SS03) were collected on top of the landfill that had hazardous substances in concentrations that met observed release criteria. Soil sample SS01 contained one volatile organic compound, one semivolatile organic compound, one pesticide, and three inorganic analytes. Soil sample SS02 contained one volatile organic compound, one semivolatile organic compound, and two inorganic analytes. Soil sample SS03 contained one semivolatile organic compound and three inorganic analytes. The substances identified at the SS01 location were xylenes (total) (0.041 mg/kg), bis(2-ethylhexyl)phthalate (12 mg/kg), 4,4'-DDD (0.082 mg/kg), beryllium (0.69 mg/kg), chromium (52.6 mg/kg), and nickel (46.1 mg/kg). The substances identified at the SS02 location include acetone (0.250 mg/kg), bis(2-ethylhexyl)phthalate (11.0 mg/kg), beryllium (0.86 mg/kg), and manganese (940 mg/kg). The substances identified at the SS03 location were bis(2-ethylhexyl)phthalate (5.3 mg/kg), beryllium (0.94 mg/kg), nickel (24.2 mg/kg), and potassium (2,800 mg/kg).

Six inorganic analytes were detected in monitoring well MW3 (GW03) in elevated concentrations that met observed release criteria, including aluminum (70.9

μg/L), barium (593 μg/L), chromium (12.7 μg/L), magnesium (290,000 μg/L), nickel (42.8 μg/L), and potassium (198,000 μg/L). Monitoring well MW2 (GW02) was used as background. According to information found in a groundwater study done for Land and Lakes No. 2 Landfill, groundwater is believed to flow in a north to northwesterly direction for the northern half of the site. The onsite residential well was also sampled but no background data is available to determine if observed release criteria is exceeded or not.

3.8 Key Samples

"Key samples" are those samples that contain substances in sufficient concentration above best available background levels to document an observed release. Table 3-3 identifies ESI key samples.

Table 3-3 Key Sample Summary								
Soil								
Substance	Sample Number and Concentration (mg/kg)							
	SS01	SS02	SS03	SS04	SS05	SS06	SS07 Background	SS08 Background
Acetone		0.250 BE					0.012 UJB	0.012 UJB
Xylenes (total)	0.041						0.012 UJ	0.012 UJ
Bis(2-ethylhexyl)phthalate	12.0 BD	11.0 BD	5.3 BD		1.8 B	8.2 BD	4.0 BD	0.38 UJB
Dieldrin						0.46 J	0.04 U	0.038 U
4,4'-DDD	0.082						0.04 U	0.038 U
Beryllium	0.69 B	0.86 B	0.94 B	0.69 B	0.24 B	0.69 B	0.45 B	0.23 U
Chromium	52.6 *					66.1 *	27.2 *	12.4 *
Copper						65.5	27.1	18.1
Manganese		940 *			855 *	1070 *	453 *	232 *
Mercury						0.23	0.12 U	0.11 U
Nickel	46.1		24.2	22.0	21.9	30.5	16.4	7.3 B
Potassium			2800	3310		3200	1960	865 B
Vanadium						41.6	29.4	13.7
Cyanide						0.83	0.59 U	0.56 U

Table 3-3 (Continued) Key Sample Summary					
Sediment					
Substance	Sample Number and Concentration (mg/kg)				
	ST01 Background	ST03	ST04	ST05	ST06
Phenanthrene	1.9	8.4			
Fluoranthene	2.7	14.0			
Pyrene	1.8 J	9.2			
Benzo(a)anthracene	1.1	7.3			
Chrysene	1.1	5.7			
Benzo(b)fluoranthene	1.1	7.2			
Benzo(a)pyrene	0.79 J	4.3			
4,4'-DDD	0.042 U			0.045	
Antimony	7.4 U		12.8 B		
Copper	23.6 *			80.1 *	
Potassium	1100 U		2240	1420	1170 B

Table 3-3 (Continued) Key Sample Summary				
Surface Water				
Substance	Sample Number and Concentration (μg/L)			
	SW01	SW03	SW04 Background	SW05
Chromium		5.6 B	3.7 U	
Magnesium			17100	68400
Sodium	136000		26000	

Table 3-3 (Continued) Key Sample Summary		
Groundwater		
Substance	Sample Number and Concentration (μg/L)	
	GW02 Background	GW03
Aluminum	41.0 U	70.9 B
Barium	67.7 B	593
Chromium	5.0 U	12.7
Magnesium	95200	290000
Nickel	21.0 U	42.8
Potassium	17900	198000

J Reported value is estimated.

U Substance is undetected. The reported value is the contract required quantitation limit (CRQL) for organics or contract required detection limit (CRDL) for inorganics.

B For organics: substance was found in the associated blank as well as in the sample. For inorganics: reported value is less than the CRDL, but greater than or equal to the instrument detection limit.

E For organics: the substance exceed the calibration range of the detection instrument. For inorganics: the report value is estimated because of the presence of interference.

D This flag is used for compounds identified in an analysis at a secondary dilution factor.

* Duplicate analysis was not within control limits.

4.0 Characterization of Sources

4.1 Introduction

The Cottage Grove Landfill has two sources of concern:

- The landfill's contents that contain hazardous substances based on previous IEPA leachate sampling and ESI groundwater sampling.
- Contaminated soil at the onsite residential property and the Cottage Grove facility, including the landfill cover, and areas used for scrap metal and vehicle parts salvage operation.

4.2 Waste Source: Landfill

4.2.1 Description

The Cottage Grove Landfill site is an inactive landfill that covers approximately 14 acres. The facility had a history of poor operating practices and was cited on numerous occasions for permit violations, including acceptance of unpermitted wastes. The landfill, which does not have an engineered liner or leachate collection system, operated from 1976 until 1982. Wastes were deposited in unpermitted areas of the site. IEPA and FIT contractor site inspection personnel observed and documented leachate ponds and seepage. In addition, FIT personnel observed erosion problems. Little information is available on the closure activity for the facility. The extent and depth of the final landfill cover are unknown.

4.2.2 Waste Characteristics

Little information is available on the specific type and quantity of solid wastes accepted at the landfill. During 1980 to 1983, however, the facility accepted approximately 136,092 dry tons of unpermitted lagoon sludge that contained heavy metals from MSD. Some sludge was accepted after closure. Analytical data for the sludge identified the following metals, with the corresponding range of concentrations:

- Mercury (1,400 - 16,000 μg/kg).
- Lead (154 - 3,390 mg/kg).
- Chromium (438 - 4,940 mg/kg).
- Cadmium (37 - 576 mg/kg).

On March 15, 1982, IEPA representatives collected groundwater samples from two monitoring wells onsite during an inspection. Analytical results indicate the presence of hazardous substances at elevated concentrations, including boron,

fluoride, ammonia, copper, iron, manganese, phenolics, phosphorous, and sulfate. On May 7, 1982, leachate ponds along the eastern slope of the fill area were sampled onsite. Results showed elevated organic and inorganic compounds similar to those identified in the earlier groundwater sampling event. IEPA personnel documented that leachate was discharged from seeps in the fill slope and collected in three water filled trenches on the eastern side of the site. Leachate seeps and stains were observed on the slope and between the trenches.

ESI sampling of groundwater monitoring wells indicates that the site's groundwater likely has been affected by unidentified sources in the landfill. ESI groundwater analytical data identified several inorganic analytes in concentrations above background levels.

4.3 Waste Source: Contaminated Soil

4.3.1 Description

Analyses of ESI soil samples indicate about 75 percent of the 18-acre property or approximately 14 acres (609,840 square feet) of soil contain an observed release. This area is defined by the key sample locations (SS01, SS02, SS03, SS04, SS05, and SS06) that document the observed release. SS05 and SS06 were collected at the onsite residential property located at the southeastern corner of the landfill. The area defined by the key samples is considered to be the area of contaminated soil.

4.3.2 Waste Characteristics

ESI analytical results indicate the area of affected soil contains releases of several organic compounds and inorganic analytes. Table 3-3 identifies the hazardous substances detected in the six key soil samples (SS01 through SS06) and two background samples (SS07 and SS08), with the associated concentrations for each sample. The following hazardous substances and their maximum concentrations are of concern:

- Acetone (0.25 mg/kg).
- Xylenes (total) (0.041 mg/kg).
- Bis(2-ethylhexyl)phthalate (12.0 mg/kg).
- Dieldrin (0.46 mg/kg).
- 4,4'-DDD (0.082 mg/kg).
- Beryllium (0.94 mg/kg).
- Chromium (66.1 mg/kg).

- Copper (65.5 mg/kg).
- Manganese (1,070 mg/kg).
- Mercury (0.23 mg/kg).
- Nickel (46.1 mg/kg).
- Potassium (3,310 mg/kg).
- Vanadium (41.6 mg/kg).
- Cyanide (0.83 mg/kg).

5.0 Discussion of Migration Pathways

5.1 Introduction

This section includes information useful in analyzing the potential environmental impact of contaminants found at the Cottage Grove Landfill site on the four migration pathways: groundwater, surface water, air, and soil.

5.2 Groundwater

The March 1982 IEPA and FIT groundwater sampling documented an observed release to the glacial drift aquifer of the groundwater pathway. Analysis of groundwater samples collected during the August 1993 ESI sampling confirmed an observed release to the groundwater pathway.

The potential exists for hazardous substances to migrate through the glacial drift aquifer to the bedrock aquifer. The landfill has no engineered liner or leachate collection system. Depth to groundwater at the site is approximately 15 feet, according to area well logs (Illinois State Water Survey 1993). The glacial drift aquifer is approximately 45 to 50 feet thick. It consists mainly of Quaternary loess and lacustrine or deposits with permeable sandy lenses. Below the drift is Silurian age Racine dolomite bedrock. The Racine Formation thickness varies from approximately 150 to 350 feet. A hydrogeologic connection may exist between the two aquifers (USGS 1991b). Groundwater generally flows downward through the glacial till beneath the neighboring Land and Lakes No. 2 Landfill (Andrew Engineering, Inc. 1988). The lack of a liner in the Cottage Grove Landfill design may allow leachate to migrate into the drift aquifer. Leachate migration may be slowed by the high clay content of the site's subsurface soils (USEPA 1984).

The site poses little threat to the local drinking water supplies. Nearly all of the population within four miles of the site is supplied by treated water from Lake Michigan. A private well, located in an onsite sheet metal garage, supplies water to an onsite residence adjacent to the landfill. Onsite residents confirmed that water extracted from the onsite private well is not used for drinking. A few private wells may exist within a four-mile radius of the site in the city of Dolton; however, none are close enough to the facility to be of primary concern. No drinking water wells screened in the glacial drift aquifer exist within four miles of the site.

Less than 25 private well owners have been identified within four miles of the site, and they are assumed to be supplied by the Silurian Dolomite bedrock aquifer.

Because of groundwater flow directions near the site, the long distances involved, and the low permeability of local soils, these users are unlikely to be affected by the site. Because of the direction of groundwater flow, hazardous substances present in the glacial drift aquifer may migrate to the Little Calumet River.

5.3 Surface Water

The Little Calumet River flows westward along the northern site boundary. There is a canal to a marina along the western site boundary. Approximately 3.5 miles downstream of the site, the Little Calumet River flows into the Calumet Sag Channel, which continues beyond to the 15-mile downstream limit from the site. Downstream targets along the surface water pathway include wetlands, fisheries, and sensitive environments. Numerous forest preserves and recreational waters, including those used for boating and fishing, exist along the frontage of these surface water bodies.

Some runoff along the western perimeter drains into the Little Calumet River. Most of the runoff along the northern and eastern landfill slopes appears to be directed to a small onsite pond. Runoff along the southern perimeter drains onto the northern side of 138th Street and flows east to an inlet for storm drainage near the southeastern corner of the Cottage Grove property.

Stormwater drainage problems were identified along the eastern and southeastern facility boundaries. Two 36-inch-diameter stormwater drainage inlets feed a 24-inch-diameter culvert that runs north, from the southeastern corner of the facility, to the Little Calumet River. The culvert is located along the eastern site border, between the Cottage Grove Landfill and the Land and Lakes No. 2 Landfill. The inlets and pipeline are designed to direct stormwater to the Little Calumet River. Visible erosion problems were observed with the northernmost inlet. The southernmost inlet was above grade, with a 2-foot high soil embankment diverting runoff from the southwestern corner of Land and Lakes No. 2 away from the inlet and onto the Cottage Grove property. Inadequate drainage between the two properties has caused runoff from the Land and Lakes facility to flood the lower sections of the Cottage Grove property along the eastern border.

The landfill facility does not have a leachate collection system. Inadequate capping of the landfill after closure and failure to maintain the proper vertical to horizontal slope ratios resulted in slope erosion and leachate production. IEPA and FIT contractor documentation indicates that the facility has had observed leachate

production and discharge problems. On May 7, 1982, leachate ponds, which were observed along the eastern slopes of the fill area, were sampled. Analytical results identified elevated levels of organic and inorganic compounds including ammonia, boron, copper, iron, manganese, phenolics and sulfate. IEPA personnel documented that leachate was discharged from seeps in the fill slope and collected in three water-filled trenches on the eastern side of the site. Leachate seeps and stains were observed on the slope and between the trenches.

ESI sediment samples in both the Little Calumet River and the onsite pond identified hazardous substances from the TCL and TAL with elevated concentrations that meet observed release criteria. The sample results document an observed release to the surface water pathway. A sediment sample collected on the western bank of the onsite pond identified several organic compounds in elevated concentrations. Downstream sediment samples collected in the Little Calumet River identified a few organic compounds and inorganic analytes that met observed release criteria. The sediment background location was selected at the most upstream point along the site boundary in the Little Calumet River, but downstream of the Land and Lakes No. 2 facility east of the site.

A surface water sample collected from the onsite pond identified one inorganic analyte that met observed release criteria. Two downstream surface water samples collected in the Little Calumet River identified one inorganic analyte in each sample. The surface water background location was selected at the most upstream point along the site boundary in the Little Calumet River, but downstream of the Land and Lakes No. 2 facility east of the site.

5.4 Air

No releases to the air pathway that are attributable to the site are on record. No air sampling was conducted during ESI field activities. Four methane gas flares are in place along the top of the landfill. During ESI sampling activities, air monitoring with a flame ionization detector showed no readings above background.

5.5 Soil

The site is inactive; however, several wastestreams may have affected site soils. Little information is available on the specific type and quantities of wastes accepted at the landfill; however, soil sampling confirmed an observed release to the soil exposure pathway. In addition to the contents of the landfill and leachate production,

sludge containing heavy metals was spread over a large site area (approximately eight acres) from 1980 to 1983.

During the ESI sampling, eight surficial soil samples were collected from depths of less than 1.0 feet. ESI analytical results indicate the area of affected soil contains releases of two volatile organic compounds, a semivolatile organic compound, two pesticides, and nine inorganic analytes in concentrations that meet observed release criteria. The area encompassed by the ESI key soil samples is about 75 percent of the 18-acre site, or approximately 14 acres (609,840 square feet) and it contains an observed release. Two of these soil samples (SS05 and SS06) were collected onsite at residential property located in the southeastern landfill corner.

The site can be accessed on foot from its southern perimeter. A front gate and limited fencing restrict vehicular site access. Areas surrounding the site are primarily industrial and not heavily populated; however, a private residence is onsite and a boating harbor used for recreational boating is adjacent to the western site border. An estimated population of over 5,000 persons is within one mile of the site; over 160,000 persons are within four miles of the site (U.S. Deptment of Commerce 1990).

6.0 References

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Appendix A

Cottage Grove Landfill

Site 4-Mile Radius Map

and

15-Mile Surface Water Route Map

DMS US EPA Region V

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Appendix A- Site 4-mile radius map & 15-mile surface water route map

Appendix B

Cottage Grove Landfill

Target Compound List and
Target Analyte List

Target Compound List

Volatiles

Chloromethane	1,2-Dichloropropane
Bromomethane	Cis-1,3-Dichloropropene
Vinyl Chloride	Trichloroethene
Chloroethane	Dibromochloromethane
Methylene Chloride	1,1,2-Trichloroethane
Acetone	Benzene
Carbon Disulfide	trans-1,3-Dichloropropane
1,1-Dichloroethene	Bromoform
1,1-Dichloroethane	4-Methyl-2-pentanone
1,2-Dichloroethene (total)	2-Hexanone
Chloroform	Tetrachloroethene
1,2-Dichloroethane	Toluene
2-Butanone	1,1,2,2-Tetrachloroethane
1,1,1-Trichloroethane	Chlorobenzene
Carbon Tetrachloride	Ethyl benzene
Bromodichloromethane	Styrene
	Xylenes (total)

Source: Target Compound List for water and soil with low or medium levels of volatile and semi-volatile organic contaminants, as shown in the Quality Assurance Project Plan for Region V Superfund Site Assessment Program, September 27, 1991.

Target Compound List (Continued)

Semivolatiles

Phenol	Acenaphthene
bis(2-Chloroethyl) ether	2,4-Dinitrophenol
2-Chlorophenol	4-Nitrophenol
1,3-Dichlorobenzene	Dibenzofuran
1,4-Dichlorobenzene	2,4-Dinitrotoluene
1,2-Dichlorobenzene	Diethylphthalate
2-Methylphenol	4-Chlorphenyl-phenyl ether
2,2-oxybis-(1-Chloropropane)*	Fluorene
4-Methylphenol	4-Nitroaniline
N-Nitroso-di-n-dipropylamine	4,6-Dinitro-2-methylphenol
Hexachloroethane	N-Nitrosodiphenylamine
Nitrobenzene	4-Bromophenyl-phenyl ether
Isophorone	Hexachlorobenzene
2-Nitrophenol	Pentachlorophenol
2,4-Dimethylphenol	Phenanthrenel
bis(2-Chloroethoxy) methane	Anthracene
2,4-Dichlorophenol	Carbazole
1,2,4-Trichlorobenzene	Di-n-butylphthalate
Naphthalene	Fluoranthene
4-Chloroaniline	Pyrene
Hexachlorobutadiene	Butyl benzyl phthalate
4-Chloro-3-methylhenol	3,3-Dichlorbenzidine
2-Methylnaphthalene	Benzo(a)anthracene
Hexachlorocyclopentadiene	Chrysene
2,4,6-Trichlorophenol	bis(2-Ethylhexyl)phthalate
2,4,5-Trichlorophenol	Di-n-Octyphthalate
2-Chloronephthalene	Benzo(b)fluoranthene
2-Nitroaniline	Benzo(k)fluoranthene
Dimethylphthalate	Benzo(a)pyrene
Acenaphthylene	Indeno(1,2,3-cd)pyrene
2,6-Dinitrotoluene	Dibenzo(a,h)anthracene
3-Nitroaniline	Benzo(g,h,i)perylene

*Previously known by the name of bis(2-chlorousipropyl) ether.

Source: Target Compound List for water and soil with low or medium levels of volatile and semivolatile organic contaminants, as shown in the Quality Assurance Project Plan for Region V Superfund Site Assessment Program, September 27, 1991.

Target Compound List (Continued)

Pesticide/PCB

alpha-BHC	4,4-DDT
beta-BHC	Methoxychlor
delta-BHC	Endrin ketone
gamma-BHC (Lindane)	Endrin aldehyde
Heptachlor	alpha-chlordane
Aldrin	gamma-chlordane
Heptachlor epoxide	Toxaphene
Endosulfan I	Aroclor-1016
Dieldrin	Aroclor-1221
4,4-DDE	Aroclor-1232
Endrin	Aroclor-1242
Endosulfan II	Aroclor-1248
4,4-DDD	Aroclor-1254
Endosulfan sulfate	Aroclor-1260

Source: Target Compound List for water and soil containing less than high concentrations of pesticides/aroclors, as shown in the Quality Assurance Project Plan for Region V Superfund Site Assessment Program, September 27, 1991.

Target Analyte List

Aluminum	Magnesium
Antimony	Manganese
Arsenic	Mercury
Barium	Nickel
Beryllium	Potassium
Cadmium	Selenium
Calcium	Silver
Chromium	Sodium
Cobalt	Thallium
Copper	Vanadium
Iron	Zinc
Lead	Cyanide

Source: Target Analyte List in the Quality Assurance Project Plan for Region V Superfund Site Assessment Program, September 27, 1991.

Appendix C

Cottage Grove Landfill

Analytical Results

Appendix C
Table of Contents

Data Reporting Qualifiers
Definitions for Organic Chemical Data Qualifiers

R - Indicates that the data are unusable. The compound may or may not be present.

U - Indicates compound was analyzed for but not detected. The associated numerical value is the sample quantitation limit.

J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds (TICs) where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.

N - Indicates presumptive evidence of a compound. This flag is only used for TICs where the identification is based on a mass spectral library search. It is applied to all TIC results. For generic characterization of a TIC, the N code is not used.

P - This flag is used for a pesticide Aroclor target analyte when there is greater than 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported and flagged with a "P".

C - This flag applies to results where identification has been confirmed by GC/MS.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination. This flag must be used for a TIC as well as for a positively identified TCL compound.

E - This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for the specific analysis. This flag will not apply to pesticide/PCBs analyzed by GC/MS methods. If one or more compounds have a response greater than full scale, the sample or extract must be diluted and re-analyzed according to the specifications.

D - This flag identifies all compounds identified in an analysis at a secondary dilution factor.

A - This flag indicates that a TIC is a suspected aldol-condensation product.

X - Other specific flags may be required to properly define the results. The "X" flags are fully described on the data tables.

D - This flag identifies all compounds identified in an analysis at a secondary dilution factor.

A - This flag indicates that a TIC is a suspected aldol-condensation product.

X - Other specific flags may be required to properly define the results. The "X" flags are fully described on the data tables.

Data Reporting Qualifiers
Definitions for Inorganic Chemical Data Qualifiers

R - Indicates that the data are unusable. The compound may or may not be present.

U - Indicates compound was analyzed for but not detected. The associated numerical value is the sample quantititaion limit.

J - Indicates an estimated value.

B - Indicates that the reported value is less than the Contract Required Detection Limit (CRDL), but greater than or equal to the Instrument Detection Limit (IDL).

E - The reported value is estimated because of the presence of interference.

M - Duplicate injection precision criteria not met.

N - Spiked sample recovery not within control limits.

S - The reported value was determined by the Method of Standard Additions (MSA).

W - Post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.

* - Duplicate analysis was not within control limits.

+ - Correlation coefficient for the MSA was less than 0.995.

Volatile Organic Analysis for Surface Water Samples
Cottage Grove Landfill

Volatile Compound	Sample Locations and Number Concentrations in ug/L				
	SW01	SW02	SW03	SW04 Background	SW05
Chloromethane	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Bromomethane	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	10 UJB	10 UJB	10 UJB	10 UJB	10 UJB
Acetone	10 UJB	10 U	10 UJB	10 U	10 U
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U
trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	10 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U
Xylene (total)	10 U	10 U	10 U	10 U	10 U
Total Number of TICS *	0	0	0	0	0

* Number, not concentrations, of tentatively identified compounds (TICs).

sw-volat

Semivolatile Organic Analysis for Surface Water Samples
Cottage Grove Landfill

Semivolatile Compound	Sample Location and Number Concentrations in ug/L				
	SW01	SW02	SW03	SW04 Background	SW05
Phenol	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)Ether	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U	10 U	10 U
n-Nitroso-Di-n-Propylamine	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy)Methane	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10 UJ	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 U	25 U	25 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	25 U	25 U	25 U
Dimethyl Phthalate	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	25 U	25 U	25 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	25 U	25 U	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 U	25 U	25 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U

Semivolatile Organic Analysis for Surface Water Samples
Cottage Grove Landfill

Semivolatile Compound	Sample Location and Number Concentrations in ug/L				
	SW01	SW02	SW03	SW04 Background	SW05
4-Nitroaniline	25 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-Methylphenol	25 U	25 U	25 U	25 U	25 U
n-Nitrosodiphenylamine	10 U	10 U	10 U	10 U	10 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	25 U	25 U	25 U	25 U	25 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U	10 U	10 U
di-n-Butylphthalate	10 UJB	10 U	10 UJB	10 UJB	10 U
Fluoranthene	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Pyrene	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U	10 U	10 U
Benzo(a)Anthracene	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)Phthalate	10 U	10 U	10 U	10 U	10 U
di-n-Octyl Phthalate	10 U	10 U	10 U	10 U	10 U
Benzo(b)Fluoranthene	10 U	10 U	10 U	10 U	10 U
Benzo(k)Fluoranthene	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
Benzo(a)Pyrene	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)Pyrene	10 U	10 U	10 U	10 U	10 U
Dibenzo(a,h)Anthracene	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)Perylene	10 U	10 U	10 U	10 U	10 U
Total Number of TICs *	3	2	0	1	0

* Number, not concentration, of tentatively identified compounds (TICs).

sw-semiv

Semivolatile Organic Analysis for Surface Water Samples Tentatively Identified Compounds Cottage Grove Landfill Concentrations in ug/L		
Compound Name	Retention Time	Estimated Concentration
Sample SW01		
Unknown	21.60	2 J
Unknown	21.65	2 J
Unknown	22.05	3 J
Sample SW02		
Unknown	22.07	2 J
Unknown	26.87	2 J
Sample SW04		
Ester Hexanedioic Acid Deriv	26.58	2 J

tic-swvo

Pesticide/PCB Analysis for Surface Water Samples
Cottage Grove Landfill

Pesticide/ PCB	Sample Locations and Number Concentrations in ug/L				
	SW01	SW02	SW03	SW04 Background	SW05
Alpha-BHC	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Beta-BHC	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Delta-BHC	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Gamma-BHC (Lindane)	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Heptachlor	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Aldrin	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Heptachlor Epoxide	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Endosulfan I	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Dieldrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDE	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan II	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDD	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endosulfan Sulfate	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
4,4'-DDT	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Methoxychlor	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Endrin Ketone	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Endrin Aldehyde	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Alpha-Chlordane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Gamma-Chlordane	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Toxaphene	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Aroclor-1016	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1221	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Aroclor-1232	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1242	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1248	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1254	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Aroclor-1260	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

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Inorganic Analysis for Surface Water Samples
Cottage Grove Landfill

Metals and Cyanide	Sample Locations and Number Concentrations in ug/L				
	SW01	SW02	SW03	SW04 Background	SW05
Aluminum	330	455	624	860	344
Antimony	29.4 U	29.4 U	29.4 U	29.4 U	29.4 U
Arsenic	2.1 B	1.9 B	2.2 B	2.2 B	5.1 B
Barium	34.2 B	36.2 B	33.6 B	32.9 B	17.2 B
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U
Calcium	42100	42900	40900	40400	49700
Chromium	3.7 U	3.7 U	5.6 B	3.7 U	3.7 U
Cobalt	4.5 U	4.5 U	4.5 U	4.5 U	4.5 U
Copper	8.1 B	11.1 B	6.3 B	9.5 B	3.6 U
Iron	669	819	1580	1630	567
Lead	4.2	5.0	11.0	10.1	2.1 B
Magnesium	16700	17100	17400	17100	68400
Manganese	53.5	56.6	69.0	63.8	79.7
Mercury	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
Nickel	13.2 U	13.2 U	13.2 U	13.2 U	13.2 U
Potassium	4620 B	5710	4840 B	5270	12900
Selenium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 UJW
Silver	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U
Sodium	136000	27200	26200	26000	76000
Thallium	5.0 UJW	1.0 U	1.0 U	1.0 U	1.0 U
Vanadium	4.7 U	4.7 U	4.7 U	4.7 U	4.7 U
Zinc	17.9 B	24.7	64.6	72.3	17.4 B
Cyanide	1.8 B	2.1 B	4.4 B	4.1 B	2.1 B

swmetals

Volatile Organic Analysis for Sediment Samples Cottage Grove Landfill						
Volatile Compound	Sample Locations and Number / Concentration in ug/kg					
	ST01 Background	ST02	ST03	ST04	ST05	ST06
Chloromethane	13 U	13 U	17 U	13 U	14 U	13 U
Bromomethane	13 U	13 U	17 U	13 U	14 U	13 U
Vinyl Chloride	13 U	13 U	17 U	13 U	14U	13 U
Chloroethane	13 U	13 U	17 U	13 U	14 U	13 U
Methylene Chloride	13 UJB	13 UJB	17 UJB	13 UJB	14 UJB	13 UJB
Acetone	13 UJB	16 UJB	27 UJB	13 UJB	18 UJB	13 UJ
Carbon Disulfide	13 U	13 U	17 U	13 U	14 U	13 U
1,1-Dichloroethene	13 U	13 U	17 U	13 U	14 U	13 U
1,1-Dichloroethane	13 U	13 U	17 U	13 U	14 U	13 U
1,2-Dichloroethene (total)	13 U	13 U	17 U	13 U	14 U	13 U
Chloroform	13 U	13 U	17 U	13 U	14 U	13 U
1,2-Dichloroethane	13 U	13 U	17 U	13 U	14 U	13 U
2-Butanone	13 U	13 U	17 U	13 U	14 U	13 U
1,1,1-Trichloroethane	13 U	13 U	17 U	13 U	14 U	13 U
Carbon Tetrachloride	13 U	13 U	17 U	13 U	14 U	13 U
Bromodichloromethane	13 U	13 U	17 U	13 U	14 U	13 U
1,2-Dichloropropane	13 U	13 U	17 U	13 U	14 U	13 U
cis-1,3-Dichloropropene	13 U	13 U	17 U	13 U	14 U	13 U
Trichloroethene	13 U	13 U	17 U	13 U	14 U	13 U
Dibromochloromethane	13 U	13 U	17 U	13 U	14 U	13 U
1,1,2-Trichloroethane	13 U	13 U	17 U	13 U	14 U	13 U
Benzene	13 U	13 U	17 U	13 U	14 U	13 U
trans-1,3-Dichloropropene	13 U	13 U	17 U	13 U	14 U	13 U
Bromoform	13 U	13 U	17 U	13 U	14 U	13 U
4-Methyl-2-Pentanone	13 U	13 U	17 U	13 U	14 U	13 U
2-Hexanone	13 U	13 U	17 U	13 U	14 U	13 U
Tetrachloroethene	13 U	13 U	17 U	13 U	14 U	13 U
1,1,2,2-Tetrachloroethane	13 U	13 U	17 U	13 U	14 U	13 U
Toluene	13 U	13 U	17 U	13 U	14 U	13 U
Chlorobenzene	13 U	13 U	17 U	13 U	14 U	13 U
Ethylbenzene	13 U	13 U	17 U	13 U	14 U	13 U
Styrene	13 U	13 U	17 U	13 U	14 U	13 U
Xylene (total)	13 U	13 U	17 U	13 U	14 U	13 U
Total Number of TICS *	0	0	0	0	0	0

* Number, not concentrations, of tentatively identified compounds (TICs). sed-vol

Semivolatile Organic Analysis for Sediment Samples
Cottage Grove Landfill

Semivolatile Compound	Sample Location and Number / Concentrations in ug/kg					
	ST01 Background	ST02	ST03	ST04	ST05	ST06
Phenol	850 U	430 U	2800 U	420 U	2300 U	430 U
bis(2-Chloroethyl)Ether	850 U	430 U	2800 U	420 U	2300 U	430 U
2-Chlorophenol	850 U	430 U	2800 U	420 U	2300 U	430 U
1,3-Dichlorobenzene	850 U	430 U	2800 U	420 U	2300 U	430 U
1,4-Dichlorobenzene	850 U	430 U	2800 U	420 U	2300 U	430 U
1,2-Dichlorobenzene	850 U	430 U	2800 U	420 U	2300 U	430 U
2-Methylphenol	850 U	430 U	2800 U	420 U	2300 U	430 U
2,2'-oxybis(1-Chloropropane	850 U	430 U	2800 U	420 U	2300 U	430 U
4-Methylphenol	850 U	430 U	2800 U	420 U	2300 U	27 J
n-Nitroso-Di-n-Propylamine	850 U	430 U	2800 U	420 U	2300 U	430 U
Hexachloroethane	850 U	430 U	2800 U	420 U	2300 U	430 U
Nitrobenzene	850 U	430 U	2800 U	420 U	2300 U	430 U
Isophorone	850 U	430 U	2800 U	420 U	2300 U	430 U
2-Nitrophenol	850 U	430 U	2800 U	420 U	2300 U	430 U
2,4-Dimethylphenol	850 U	430 U	2800 U	420 U	2300 U	430 U
bis(2-Chloroethoxy)Methane	850 U	430 U	2800 U	420 U	2300 U	430 U
2,4-Dichlorophenol	850 U	430 U	2800 U	420 U	2300 U	430 U
1,2,4-Trichlorobenzene	850 U	430 U	2800 U	420 U	2300 U	430 U
Naphthalene	150 J	430 U	240 J	420 U	2300 U	35 J
4-Chloroaniline	850 U	430 U	2800 U	420 U	2300 U	430 U
Hexachlorobutadiene	850 U	430 U	2800 U	420 U	2300 U	430 U
4-Chloro-3-Methylphenol	850 U	430 U	2800 U	420 U	2300 U	430 U
2-Methylnaphthalene	850 U	430 U	320 J	45 J	2300 U	430 U
Hexachlorocyclopentadiene	850 U	430 U	2800 U	420 U	2300 U	430 U
2,4,6-Trichlorophenol	850 U	430 U	2800 U	420 U	2300 U	430 U
2,4,5-Trichlorophenol	2100 U	1100 U	6900 U	1000 U	5500 U	1000 U
2-Chloronaphthalene	850 U	430 U	2800 U	420 U	2300 U	430 U
2-Nitroaniline	2100 U	1100 U	6900 U	1000 U	5500 U	1000 U
Dimethyl Phthalate	850 U	430 U	2800 U	420 U	2300 U	430 U
Acenaphthylene	850 U	430 U	2800 U	420 U	2300 U	430 U
2,6-Dinitrotoluene	850 U	430 U	2800 U	420 U	2300 U	430 U
3-Nitroaniline	2100 U	1100 U	6900 U	1000 U	5500 U	1000 U
Acenaphthene	210 J	430 U	730 J	33 J	2300 U	430 U
2,4-Dinitrophenol	2100 U	1100 U	6900 U	1000 U	5500 U	1000 U
4-Nitrophenol	2100 U	1100 U	6900 U	1000 U	5500 U	1000 U
Dibenzofuran	150 J	430 U	490 J	26 J	2300 U	430 U
2,4-Dinitrotoluene	850 U	430 U	2800 U	420 U	2300 U	430 U
Diethylphthalate	850 U	430 U	2800 U	420 UJB	2300 U	430 UJB
4-Chlorophenyl-phenylether	850 U	430 U	2800 U	420 U	2300 U	430 U
Fluorene	850 U	430 U	1100 J	28 J	2300 U	430 U
4-Nitroaniline	2100 U	1100 U	6900 U	1000 U	5500 U	1000 U

Semivolatile Organic Analysis for Sediment Samples
Cottage Grove Landfill

Semivolatile Compound	Sample Location and Number / Concentrations in ug/kg					
	ST01 Background	ST02	ST03	ST04	ST05	ST06
4,6-Dinitro-2-Methylphenol	2100 U	1100 U	6900 U	1000 U	5500 U	1000 U
n-Nitrosodiphenylamine	100 J	59 J	2800 U	79 J	160 J	430 U
4-Bromophenyl-phenylether	850 U	430 U	2800 U	420 U	2300 U	430 U
Hexachlorobenzene	850 U	430 U	2800 U	420 U	2300 U	430 U
Pentachlorophenol	2100 UJ	1100 UJ	6900 U	1000 UJ	5500 U	1000 UJ
Phenanthrene	1900	73 J	8400	230 J	600 J	230 J
Anthracene	470 J	430 U	2500 J	42 J	600 J	43 J
Carbazole	180 J	430 U	820 J	420 U	2300 U	25 J
di-n-Butylphthalate	850 UJB	430 UJB	490 UJB	420 UJB	2300 UJB	430 UJB
Fluoranthene	2700	120 J	14000	300 J	1300 J	320 J
Pyrene	1800 J	110 J	9200	210 J	870 J	240 J
Butylbenzylphthalate	43 J	430 U	2800 U	420 U	2300 U	27 J
3,3'-Dichlorobenzidine	850 U	430 U	2800 U	420 U	2300 U	430 U
Benzo(a)Anthracene	1100	59 J	7300	150 J	620 J	160 J
Chrysene	1100	56 J	5700	140 J	650 J	230 J
bis(2-Ethylhexyl)Phthalate	500 J	430 U	310 J	130 J	350 J	1500 J
di-n-Octyl Phthalate	850 U	430 U	2800 U	420 U	2300 U	430 U
Benzo(b)Fluoranthene	1100	75 J	7200	170 J	760 J	210 J
Benzo(k)Fluoranthene	600 J	27 J	2800 J	68 J	1000 J	97 J
Benzo(a)Pyrene	790 J	48 J	4300	92 J	340 J	150 J
Indeno(1,2,3-cd)Pyrene	490 J	35 J	2700 J	67 J	310 J	86 J
Dibenzo(a,h)Anthracene	850 U	430 U	2800 U	420 U	150 J	430 U
Benzo(g,h,i)Perylene	140 J	430 U	660 J	420 U	2300 U	32 J
Total Number of TICs*	18	19	20	18	14	20

* Numbers, not concentrations, of tentatively identified compounds (TICs).

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Semivolatile Organic Analysis for Sediment Samples Tentatively Identified Compounds Cottage Grove Landfill Concentrations in ug/kg		
Compound Name	Retention Time	Estimated Concentration
Sample ST01		
Unknown Hydrocarbon	8.35	600 J
Unknown Hydrocarbon	10.15	900 J
Unknown Hydrocarbon	13.38	940 J
Unknown Hydrocarbon	14.87	810 J
Unknown Hydrocarbon	18.13	680 J
Unknown Hydrocarbon	18.82	1600 J
Unknown Hydrocarbon	19.97	810 J
Unknown Hydrocarbon	29.12	640 J
Unknown PNA	29.63	640 J
Unknown Phthalate	30.93	560 J
Unknown Phthalate	31.13	680 J
Unknown Phthalate	31.68	640 J
Unknown	32.15	810 J
Unknown Phthalate	32.38	1400 J
Unknown	32.55	810 J
Unknown Phthalate	33.02	1900 J
Unknown Phthalate	33.68	5600 J
Unknown Phthalate	35.43	7700 J
Sample ST02		
Unknown	13.82	110 J
Unknown	15.18	130 J
Unknown Hydrocarbon	18.13	280 J
Unknown	18.48	130 J
Unknown Hydrocarbon	18.82	590 J
Unknown	19.27	88 J
Unknown Hydrocarbon	19.97	420 J
Unknown Hydrocarbon	20.82	88 J
Unknown Hydrocarbon	20.92	88 J
Unknown Hydrocarbon	24.45	110 J
Unknown	25.73	590 J
Unknown Hydrocarbon	25.97	240 J
Unknown	26.08	310 J
Unknown Hydrocarbon	27.40	280 J
Unknown	27.53	260 J
Unknown Hydrocarbon	28.18	110 J
Unknown Hydrocarbon	29.10	420 J
Unknown	31.43	480 J
Unknown	32.53	180 J

Semivolatile Organic Analysis for Sediment Samples Tentatively Identified Compounds Cottage Grove Landfill Concentrations in ug/kg		
Compound Name	Retention Time	Estimated Concentration
Sample ST03		
Unknown Hydrocarbon	18.77	1400 J
Unknown PNA	21.33	1700 J
Unknown PNA	21.53	2300 J
Unknown PNA	21.98	720 J
Unknown	23.58	1100 J
Unknown	23.98	1300 J
Unknown PNA	24.23	4000 J
Unknown PNA	24.38	4000 J
Unknown	24.47	2000 J
Unknown	25.40	1000 J
Benzo(B) naphtho thiophene isomer	25.65	1400 J
Unknown PNA	25.72	1000 J
Unknown	26.47	1700 J
Unknown PNA	27.10	1600 J
Unknown Hydrocarbon	27.33	2700 J
Unknown	28.32	1000 J
Unknown Hydrocarbon	29.03	6000 J
Unknown	29.55	3200 J
Unknown Hydrocarbon	31.35	2700 J
Unknown	36.30	860 J
Sample ST04		
Unknown Hydrocarbon	10.67	1200 J
Unknown Hydrocarbon	11.83	1100 J
Unknown Hydrocarbon	12.03	1200 J
Unknown Hydrocarbon	12.97	830 J
Unknown Hydrocarbon	13.40	1800 J
Unknown Hydrocarbon	14.88	1600 J
Unknown Hydrocarbon	15.72	1100 J
Unknown Hydrocarbon	17.58	1100 J
Unknown Hydrocarbon	18.15	1100 J
Unknown Hydrocarbon	18.83	3000 J
Unknown Hydrocarbon	19.98	900 J
Unknown Hydrocarbon	20.95	830 J
Unknown Hydrocarbon	21.90	900 J
Unknown Hydrocarbon	22.80	810 J
Unknown Hydrocarbon	24.47	790 J
Unknown Hydrocarbon	25.25	700 J
Unknown Hydrocarbon	26.00	750 J
Unknown Hydrocarbon	26.72	730 J
Unknown Hydrocarbon	28.22	470 J
Unknown Hydrocarbon	29.13	450 J

Semivolatile Organic Analysis for Sediment Samples Tentatively Identified Compounds Cottage Grove Landfill Concentrations in ug/kg		
Compound Name	Retention Time	Estimated Concentration
Sample ST05		
Unknown Hydrocarbon	13.37	690 J
Unknown Hydrocarbon	14.83	690 J
Unknown Hydrocarbon	15.67	460 J
Unknown Hydrocarbon	17.53	570 J
Unknown Hydrocarbon	18.12	570 J
Unknown Hydrocarbon	18.78	1500 J
Unknown Hydrocarbon	19.87	460 J
Unknown Hydrocarbon	19.93	460 J
Unknown Hydrocarbon	20.90	570 J
Unknown Hydrocarbon	22.77	460 J
Unknown Hydrocarbon	25.20	570 J
Unknown Hydrocarbon	26.67	460 J
Unknown Hydrocarbon	29.07	570 J
Unknown	30.20	11000 J
Sample ST06		
Unknown Hydrocarbon	10.20	1100 J
Unknown Hydrocarbon	11.87	1100 J
Unknown Hydrocarbon	12.07	1100 J
Unknown Hydrocarbon	13.43	1800 J
Unknown Hydrocarbon	14.92	1400 J
Unknown Hydrocarbon	15.75	970 J
Unknown Hydrocarbon	16.30	1300 J
Unknown Hydrocarbon	17.62	990 J
Unknown Hydrocarbon	18.18	950 J
Unknown Hydrocarbon	18.87	2400 J
Unknown Hydrocarbon	19.95	760 J
Unknown Hydrocarbon	20.02	930 J
Unknown Hydrocarbon	20.97	760 J
Unknown Hydrocarbon	21.93	760 J
Unknown Hydrocarbon	22.83	610 J
Unknown Hydrocarbon	24.50	670 J
Unknown Hydrocarbon	26.03	860 J
Unknown Hydrocarbon	26.73	580 J
Unknown Hydrocarbon	27.45	580 J
Unknown	30.28	480 J

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Pesticide/PCB Analysis for Sediment Samples Cottage Grove Landfill						
Pesticide/ PCB	Sample Location and Number / Concentrations in ug/kg					
	ST01 Background	ST02	ST03	ST04	ST05	ST06
Alpha-BHC	22 U	2.2 U	29 UJ	2.2 U	9.3 U	8.8 U
Beta-BHC	22 U	2.2 U	29 UJ	2.2 U	9.3 U	8.8 U
Delta-BHC	22 U	2.2 U	29 UJ	2.2 U	9.3 U	8.8 U
Gamma-BHC (Lind.)	22 U	2.2 U	29 UJ	2.2 U	9.3 U	8.8 U
Heptachlor	22 U	2.2 U	29 UJ	2.2 U	9.3 U	8.8 U
Aldrin	22 U	2.2 U	29 UJ	2.2 U	9.3 U	8.8 U
Heptachlor Epoxide	22 U	2.2 U	29 UJ	2.2 U	9.3 U	8.8 U
Endosulfan I	22 U	2.2 U	29 UJ	2.2 U	9.3 U	8.8 U
Dieldrin	42 U	4.3 U	57 UJ	4.2 U	18 U	17 U
4,4'-DDE	42 U	4.3 U	44 JP	3.7 J	18 U	17 U
Endrin	42 U	4.3 U	57 UJ	4.2 U	18 U	17 U
Endosulfan II	42 U	4.3 U	57 UJ	4.2 U	18 U	17 U
4,4'-DDD	42 U	4.1 JP	52 JP	14	45	12 JP
Endosulfan Sulfate	42 U	4.3 U	57 UJ	4.2 U	18 U	17 U
4,4'-DDT	42 U	3.4 JP	91 J	8.8 P	18 U	17 U
Methoxychlor	220 U	22 U	290 UJ	22 U	93 U	88 U
Endrin Ketone	42 U	4.3 U	57 UJ	4.2 U	18 U	17 U
Endrin Aldehyde	42 U	4.3 U	57 UJ	4.2 U	18 U	17 U
Alpha-Chlordane	22 U	2.2 U	29 UJ	2.2 U	9.3 U	8.8 U
Gamma-Chlordane	22 U	2.2 U	29 UJ	2.2 U	9.3 U	8.8 U
Toxaphene	2200 U	220 U	2900 UJ	220 U	930 U	880 U
Aroclor-1016	420 U	43 U	570 UJ	42 U	180 U	170 U
Aroclor-1221	860 U	88 U	1200 UJ	86 U	370 U	350 U
Aroclor-1232	420 U	43 U	570 UJ	42 U	180 U	170 U
Aroclor-1242	420 U	43 U	570 UJ	42 U	180 U	170 U
Aroclor-1248	420 U	43 U	570 UJ	42 U	180 U	170 U
Aroclor-1254	180 JP	32 J	570 UJ	56	250	140 J
Aroclor-1260	420 U	43 U	570 UJ	42 U	180 U	170 U

Pest sed

Inorganic Analysis for Sediment Samples
Cottage Grove Landfill

Metals and Cyanide	Sample Location and Number Concentrations in mg/kg					
	ST01 Background	ST02	ST03	ST04	ST05	ST06
Aluminum	5420 J*	2540 J*	5160 J*	7850 J*	7300 J*	5860 J*
Antimony	7.4 U	8.8 U	11.3 U	12.8 B	7.6 U	7.1 U
Arsenic	21.9 JN*	3.0 JN*	5.1 JN*	5.7 JN*	12.6 JN*	8.2 JN*
Barium	67.4	25.2 B	51.2 B	47.5 B	92.3	45.7 B
Beryllium	0.76 B	0.30 U	0.38 U	0.42 B	0.35 B	0.50 B
Cadmium	1.5	0.84 U	1.4 B	0.74 U	2.8	3.7
Calcium	79100 J	29100 J	50200 J	54000 J	41200 J	70500 J
Chromium	31.3 *	9.2 *	28.5 *	18.7 *	38.6 *	27.6 *
Cobalt	8.3 B	5.8 B	8.5 B	12.6 B	13.7	10.7 B
Copper	23.6 *	9.4 *	30.7 *	27.7 *	80.1 *	30.2 *
Iron	23600	9380	15600	20400	24500	20800
Lead	195 J*	19.2 J*	100 J*	24.7 J*	78.7 J*	70.2 J*
Magnesium	34000 J	11900 J	26400 J	24000 J	21700 J	35400 J
Manganese	1600	275	355	452	396	490
Mercury	0.08 B*	0.07 U*	0.10 U*	0.07 U*	0.07 B*	0.06 U*
Nickel	15.4	9.7 B	19.4	30.5	38.3	39.4
Potassium	1100 U	1320 U	1690 U	2240	1420	1170 B
Selenium	0.26 JBNW	0.30 UJNW	0.38 UJN	0.26 UJNW	0.26 UJNW	0.24 UJNW
Silver	0.85 U	1.0 U	1.3 U	0.90 U	0.88 U	0.82 U
Sodium	366 UB	134 UB	314 UB	276 UB	172 UB	206 UB
Thallium	0.68 B	0.30 U	0.38 U	0.36 B	0.80 B	0.47 B
Vanadium	18.9	9.6 B	13.3 B	16.5	17.3	12.8
Zinc	126 UJN*	38.4 UJN*	114 UJN*	78.4 UJN*	194 UJN*	266 UJN*
Cyanide	1.0 U*	0.14 UB*	0.39 UB*	0.10 U*	0.11 UB*	1.1 U*

sedmetal

Volatile Organic Analysis for Soil Samples Cottage Grove Landfill								
Volatile Compound	Sample Locations and Number Concentrations in ug/kg							
	SS01	SS02	SS03	SS04	SS05	SS06	SS07 Background	SS08 Background
Chloromethane	12 UJ	11 UJ	11 UJ	12 UJ	11 UJ	11 UJ	12 UJ	12 UJ
Bromomethane	12 U	11 U	11 U	12 U	11 U	11 U	12 U	12 U
Vinyl Chloride	12 U	11 U	11 U	12 U	11 U	11 U	12 U	12 U
Chloroethane	12 U	11 U	11 U	12 U	11 U	11 U	12 U	12 U
Methylene Chloride	15 UB	11 UJB	29 UB	14 UB	11 UJB	14 UB	12 UJB	21 UB
Acetone	26 UB	250 BE	11 UJB	12 UB	11 U	11 UJB	12 UJB	12 UJB
Carbon Disulfide	12 U	11 U	2 J	2 J	11 U	11 U	12 U	3 J
1,1-Dichloroethene	1 J	11 U	2 J	12 U	11 U	11 U	1 J	12 U
1,1-Dichloroethane	12 U	11 U	11 U	12 U	11 U	11 U	12 U	12 U
1,2-Dichloroethene (total)	12 U	11 U	11 U	12 U	11 U	11 U	12 U	12 U
Chloroform	12 U	11 U	11 U	12 U	11 U	11 U	12 U	12 U
1,2-Dichloroethane	12 U	11 U	11 U	12 U	11 U	11 U	12 U	12 U
2-Butanone	12 U	11 U	11 U	12 U	11 U	11 U	12 U	12 U
1,1,1-Trichloroethane	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
Carbon Tetrachloride	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
Bromodichloromethane	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
1,2-Dichloropropane	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
cis-1,3-Dichloropropene	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
Trichloroethene	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
Dibromochloromethane	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
1,1,2-Trichloroethane	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
Benzene	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
trans-1,3-Dichloropropene	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
Bromoform	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
4-Methyl-2-Pentanone	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
2-Hexanone	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
Tetrachloroethene	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
1,1,2,2-Tetrachloroethane	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
Toluene	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
Chlorobenzene	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
Ethylbenzene	8 J	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
Styrene	12 U	11 U	11 U	12 U	11 U	11 U	12 UJ	12 UJ
Xylene (total)	41	1 J	11 U	12 U	11 U	11 U	12 UJ	12 UJ
Total Number of TICs *	9	9	0	2	1	1	0	0

* Number, not concentrations, of tentatively identified compounds (TICs).

soil-vol

Volatile Organic Analysis for Soil Samples Tentatively Identified Compounds Cottage Grove Landfill Concentrations in ug/kg		
Compound Name	Retention Time	Estimated Concentration
Sample SS01		
Methane, Trichlorofluoro	2.67	3 JN
Ethane, 1,1,2-Trichloro-1,2	3.13	6 JNB
Unknown Cyclic Hydrocarbon	14.48	30 J
Unknown Hydrocarbon	14.17	20 J
Unknown Cyclic Hydrocarbon	10.67	4 J
Unknown Hydrocarbon	14.07	15 J
Unknown Cyclic Hydrocarbon	12.52	25 J
Unknown Cyclic Hydrocarbon	13.05	32 J
Unknown Hydrocarbon	13.17	30 J
Sample SS02		
VU-1 Unknown Alcohol	2.98	11 J
Methane, Thiobis	3.45	11 JN
VU-3 Unknown Hydrocarbon	14.48	4 J
VU-3 Cyclic Unknown Hydrocarbon	14.17	6 J
VU-3 Unknown Hydrocarbon	14.03	7 J
VU-3, Cyclohexane,-Ethyl-M	12.52	5 J
VU-3 Unknown Hydrocarbon	12.82	1 J
VU-3 Unknown Hydrocarbon	13.07	5 J
VU-3 Unknown Hydrocarbon	13.18	4 J
Sample SS04		
Methane, Trichlorofluoro	2.72	5 JN
CI01 Bromochloromethane	5.82	59 J
Sample SS05		
Methane, Trichlorofluoro	3.08	13 JN
Sample SS06		
Methane, Trichlorofluoro	2.70	5 JN

TIC-VOL

Semivolatile Organic Analysis for Soil Samples
Cottage Grove Landfill

Semivolatile Compound	Sample Location and Number / Concentrations in ug/kg							
	SS01	SS02	SS03	SS04	SS05	SS06	SS07 Background	SS08 Background
Phenol	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
bis(2-Chloroethyl)Ether	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
2-Chlorophenol	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
1,3-Dichlorobenzene	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
1,4-Dichlorobenzene	390 U	140 J	360 U	390 U	370 U	380 U	400 U	380 U
1,2-Dichlorobenzene	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
2-Methylphenol	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
2,2'-oxybis(1-Chloropropane	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
4-Methylphenol	87 J	380 U	360 U	390 U	370 U	380 U	400 U	380 U
n-Nitroso-Di-n-Propylamine	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
Hexachloroethane	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
Nitrobenzene	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
Isophorone	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
2-Nitrophenol	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
2,4-Dimethylphenol	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
bis(2-Chloroethoxy)Methane	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
2,4-Dichlorophenol	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
1,2,4-Trichlorobenzene	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
Naphthalene	40 J	380 U	360 U	46 J	370 U	39 J	400 U	380 U
4-Chloroaniline	390 UJ	380 UJ	360 UJ	390 UJ	370 UJ	380 UJ	400 U	380 U
Hexachlorobutadiene	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
4-Chloro-3-Methylphenol	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
2-Methylnaphthalene	44 J	380 U	360 U	43 J	370 U	52 J	400 U	380 U
Hexachlorocyclopentadiene	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
2,4,6-Trichlorophenol	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
2,4,5-Trichlorophenol	940 U	910 U	870 U	940 U	890 U	910 U	980 U	920 U
2-Chloronaphthalene	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
2-Nitroaniline	940 UJ	910 U	870 U	940 U	890 U	910 U	980 U	920 U
Dimethyl Phthalate	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
Acenaphthylene	390 U	380 U	360 U	390 U	370 U	44 J	400 U	380 U
2,6-Dinitrotoluene	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
3-Nitroaniline	940 UJ	910 UJ	870 UJ	940 UJ	890 UJ	910 UJ	980 UJ	920 UJ
Acenaphthene	390 U	380 U	360 U	91 J	370 U	45 J	400 U	39 J
2,4-Dinitrophenol	940 U	910 U	870 U	940 U	890 U	910 U	980 UJ	920 U

Semivolatile Organic Analysis for Soil Samples
Cottage Grove Landfill

Semivolatile Compound	Sample Location and Number / Concentrations in ug/kg							
	SS01	SS02	SS03	SS04	SS05	SS06	SS07 Background	SS08 Background
4-Nitrophenol	940 U	910 U	870 U	940 U	890 U	910 U	980 U	920 U
Dibenzofuran	390 U	380 U	360 U	66 J	370 U	380 U	400 U	380 U
2,4-Dinitrotoluene	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
Diethylphthalate	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
4-Chlorophenyl-phenylether	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
Fluorene	390 U	380 U	360 U	110 J	370 U	43 J	400 U	43 J
4-Nitroaniline	940 U	910 U	870 U	940 U	890 U	910 U	980 U	920 U
4,6-Dinitro-2-Methylphenol	940 U	910 U	870 U	940 U	890 U	910 U	980 U	920 U
n-Nitrosodiphenylamine	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
4-Bromophenyl-phenylether	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
Hexachlorobenzene	390 U	380 U	360 U	390 U	370 U	380 U	400 U	380 U
Pentachlorophenol	940 UJ	910 UJ	870 UJ	940 UJ	890 UJ	910 UJ	980 UJ	920 UJ
Phenanthrene	220 J	380 U	41 J	1100	150 J	580	370 J	530
Anthracene	34 J	380 U	360 U	170 J	370 U	80 J	43 J	83 J
Carbazole	38 J	380 UJ	360 UJ	97 J	370 UJ	55 J	80 J	70 J
di-n-Butylphthalate	390 U	380 U	360 U	390 U	370 U	380 U	29 J	380 U
Fluoranthene	210 J	43 J	66 J	1100	230 J	730	580	770
Pyrene	220 J	52 J	79 J	1300	260 J	670	610	850
Butylbenzylphthalate	390 U	380 U	360 U	390 U	370 U	50 J	34 J	380 U
3,3'-Dichlorobenzidine	390 UJ	380 UJ	360 UJ	390 UJ	370 UJ	380 UJ	400 U	380 U
Benzo(a)Anthracene	170 J	68 J	39 J	850	160 J	540	320 J	500
Chrysene	160 J	110 J	48 J	860	190 J	620	380 J	490
bis(2-Ethylhexyl)Phthalate	12000 BD	11000 BD	5300 BD	390 UJB	1800 B	8200 BD	4000 BD	380 UJB
di-n-Octyl Phthalate	250 J	270 J	140 J	390 U	370 U	150 J	100 J	380 U
Benzo(b)Fluoranthene	210 J	110 J	37 J	670	160 J	710	420	530
Benzo(k)Fluoranthene	160 J	50 J	56 J	630	180 J	480	330 J	410
Benzo(a)Pyrene	180 J	62 J	48 J	780	170 J	590	340 J	460
Indeno(1,2,3-cd)Pyrene	210 J	58 J	360 U	450	140 J	450	360 J	430
Dibenzo(a,h)Anthracene	68 J	380 U	360 U	190 J	40 J	130 J	110 J	150 J
Benzo(g,h,i)Perylene	180 J	61 J	360 U	460	120 J	420	420	430
Total Number of TICs*	20	20	20	20	20	20	20	20

*Number, not concentration, of tentatively identified compounds (TICs).

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Semivolatile Organic Analysis for Soil Samples Tentatively Identified Compounds Cottage Grove Landfill Concentrations in ug/kg			
Compound Name	Retention Time	Estimated Concentration	
Sample SS01			
Unknown Hydrocarbon	7.22	280	J
Unknown Hydrocarbon	8.82	420	J
Unknown	14.07	500	J
Unknown	14.58	170	J
Unknown	15.58	280	J
Unknown Hydrocarbon	15.85	190	J
Unknown Hydrocarbon	15.90	140	J
Fatty Acid	18.03	170	J
Unknown Hydrocarbon	19.42	310	J
Unknown Phthalate	21.63	170	J
Unknown Phthalate	21.72	270	J
Unknown Phthalate	21.98	250	J
Unknown	24.58	350	J
Unknown	24.93	390	J
Unknown Hydrocarbon	25.78	250	J
Unknown Hydrocarbon	29.13	310	J
Unknown	30.38	420	J
Unknown	32.53	560	J
Unknown	34.30	540	J
Unknown	36.80	3500	J
Sample SS02			
Unknown Hydrocarbon	6.57	110	J
Unknown Hydrocarbon	7.13	100	J
Ketone	7.82	540	J
Unknown Hydrocarbon	8.78	240	J
Unknown Hydrocarbon	17.98	110	J
Fatty Acid	18.05	370	J
Unknown Hydrocarbon	19.15	130	J
Unknown Hydrocarbon	19.45	1300	J
Fatty Acid	19.55	130	J
Unknown Phthalate	24.63	190	J
Unknown	25.82	1700	J
Unknown	24.98	280	J
Unknown Phthalate	25.15	200	J
Unknown Hydrocarbon	25.68	2500	J
Unknown Phthalate	25.95	5700	J
Unknown	26.15	3300	J
Unknown	29.13	250	J
Unknown Hydrocarbon	29.20	400	J
Unknown	34.38	410	J
Unknown	36.82	960	J

Semivolatile Organic Analysis for Soil Samples Tentatively Identified Compounds Cottage Grove Landfill Concentrations in ug/kg		
Compound Name	Retention Time	Estimated Concentration
Sample SS03		
Ketone	7.80	230 AJ
Unknown Hydrocarbon	11.93	88 J
Unknown Hydrocarbon	13.02	95 J
Unknown Hydrocarbon	13.65	79 J
Unknown Hydrocarbon	13.82	100 J
Unknown Hydrocarbon	14.02	100 J
Unknown Hydrocarbon	14.97	77 J
Unknown Hydrocarbon	15.42	78 J
Unknown Hydrocarbon	15.92	350 J
Unknown Hydrocarbon	16.80	93 J
Unknown Hydrocarbon	19.03	86 J
Unknown Hydrocarbon	20.43	65 J
Unknown Hydrocarbon	21.72	91 J
Unknown	24.58	180 J
Unknown Phthalate	25.65	3500 J
Unknown	25.78	4600 J
Unknown	27.18	270 J
Unknown	27.23	180 J
Unknown	29.17	200 J
Unknown	31.48	690 J
Sample SS04		
Ketone	6.55	360 J
Cyclohexene, -Methylene-1-	7.42	480 J
Ketone	7.80	470 AJ
Unknown Hydrocarbon	15.90	420 J
Unknown Hydrocarbon	16.78	200 J
Unknown Hydrocarbon	17.98	680 J
Fatty Acid	18.03	310 J
Mixture PNA (MW190) + (MW192)	18.17	220 J
Unknown Hydrocarbon	19.42	250 J
Alkyl PNA (MW216)	20.42	260 J
Unknown Hydrocarbon	21.72	570 J
Unknown Hydrocarbon	23.33	400 J
Unknown Hydrocarbon	24.97	1200 J
Unknown Hydrocarbon	25.70	1300 J
Unknown Hydrocarbon	25.83	1300 J
PNA (MW252)	26.53	500 J
Unknown	27.55	460 J
Unknown Hydrocarbon	29.25	2000 J
PNA (MW276)	33.23	490 J
Unknown	33.90	380 J
Unknown	36.87	790 J

Semivolatile Organic Analysis for Soil Samples Tentatively Identified Compounds Cottage Grove Landfill Concentrations in ug/kg		
Compound Name	Retention Time	Estimated Concentration
Sample SS05		
Unknown Hydrocarbon	6.55	210 J
Ketone	7.80	390 AJ
Unknown	8.77	230 J
Unknown Hydrocarbon	13.20	140 J
Unknown	15.60	90 J
Unknown Hydrocarbon	15.83	90 J
Fatty Acid	18.03	190 J
Unknown Hydrocarbon	21.72	170 J
Unknown Hydrocarbon	23.33	710 J
Unknown Hydrocarbon	24.97	420 J
Unknown Hydrocarbon	25.70	1000 J
Unknown Hydrocarbon	25.83	440 J
Unknown Hydrocarbon	28.18	160 J
Unknown Hydrocarbon	29.23	2100 J
Unknown	30.98	210 J
Unknown	31.70	1100 J
Unknown	34.43	1300 J
Unknown Hydrocarbon	34.70	340 J
Unknown	35.25	300 J
Unknown	36.85	900 J
Sample SS06		
Ketone	7.80	280 AJ
Unknown Hydrocarbon	13.02	170 J
Unknown Hydrocarbon	15.42	180 J
Unknown Hydrocarbon	15.92	460 J
Unknown	18.00	150 J
PNA (MW216)	20.43	140 J
PNA (MW234)	21.65	330 J
Unknown Hydrocarbon	21.73	630 J
Unknown	22.02	250 J
Unknown Hydrocarbon	22.48	240 J
Unknown Hydrocarbon	23.38	230 J
Unknown Hydrocarbon	25.05	570 J
Unknown Hydrocarbon	25.78	510 J
Unknown Hydrocarbon	25.92	930 J
PNA (MW252)	26.65	740 J
PNA (MW252)	27.25	240 J
Unknown	27.70	680 J
Unknown Hydrocarbon	29.37	770 J
Unknown	34.62	450 J
Unknown	34.67	260 J

Semivolatile Organic Analysis for Soil Samples Tentatively Identified Compounds Cottage Grove Landfill Concentrations in ug/kg		
Compound Name	Retention Time	Estimated Concentration
Sample SS07		
Unknown	6.62	240 J
Ketone	7.78	360 AJ
Unknown	8.72	380 J
Alkyl PNA (MW192)	17.80	150 J
Unknown	19.05	140 J
4,7-Methano-1H-Indene,-Octa	19.40	140 JN
Unknown Hydrocarbon	21.58	1000 J
Unknown	21.67	400 J
Unknown	21.80	390 J
Unknown Hydrocarbon	23.13	360 J
Unknown Hydrocarbon	24.70	1700 J
Unknown Hydrocarbon	25.38	860 J
Unknown Hydrocarbon	25.53	1900 J
PNA (MW252)	26.15	350 J
Unknown Hydrocarbon	28.78	1500 J
Unknown	29.38	290 J
Unknown	30.47	3400 J
Unknown	33.75	5100 J
Unknown Hydrocarbon	33.98	290 J
Unknown	34.50	890 J
Unknown	36.05	660 J
Sample SS08		
Unknown	7.00	440 J
Ketone	8.88	220 J
Mixture PNA (MW190 + MW192)	18.07	120 J
Unknown Hydrocarbon	18.93	140 J
Alkyl PNA (MW216)	20.30	210 J
Unknown Hydrocarbon	21.62	1100 J
Unknown Hydrocarbon	23.17	810 J
Unknown Hydrocarbon	23.22	350 J
Unknown Hydrocarbon	24.18	520 J
Unknown Hydrocarbon	24.73	2300 J
Unknown Hydrocarbon	25.43	2300 J
Unknown Hydrocarbon	25.57	2300 J
PNA (MW252)	26.22	580 J
Unknown Hydrocarbon	27.83	1100 J
Unknown Hydrocarbon	28.82	2500 J
Unknown Hydrocarbon	29.08	340 J
Unknown	29.45	360 J
Unknown	29.97	280 J
Unknown	33.75	740 J
Unknown Hydrocarbon	34.02	630 J
Unknown	36.08	420 J

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Pesticide/Pcb Analysis for Soil Samples Cottage Grove Landfill								
Pesticide/ PCB	Sample Location and Number Concentrations in ug/kg							
	SS01	SS02	SS03	SS04	SS05	SS06	SS07 Background	SS08 Background
Alpha-BHC	20 U	1.9 U	1.8 U	2.0 RU	1.9 U	19 U	21 U	20 U
Beta-BHC	20 U	1.9 U	1.8 U	2.0 RU	1.9 U	19 U	21 U	20 U
Delta-BHC	20 U	1.9 U	1.8 U	2.0 RU	1.9 U	19 U	21 U	20 U
Gamma-BHC (Lindane)	20 U	1.9 U	1.8 U	2.0 RU	1.9 U	19 U	21 U	20 U
Heptachlor	20 U	1.9 U	1.8 U	2.0 RU	1.9 U	19 U	21 U	20 U
Aldrin	20 U	1.9 U	1.8 U	2.0 RU	1.9 U	19 U	21 U	20 U
Heptachlor Epoxide	20 U	1.9 U	1.8 U	2.0 RU	1.9 U	19 U	420	20 U
Endosulfan I	20 U	1.9 U	1.8 U	2.0 RU	1.9 U	19 U	21 U	20 U
Dieldrin	39 U	5.7	3.6 U	3.9 RU	3.7 U	460 J	40 U	38 U
4,4'-DDE	39 U	3.7 U	5.6	9.9 J	23	37 U	40 U	65 J
Endrin	39 U	3.7 U	3.6 U	3.9 RU	3.7 U	37 U	40 U	38 U
Endosulfan II	39 U	3.7 U	3.6 U	3.9 RU	3.7 U	37 U	40 U	38 U
4,4'-DDD	82	3.7 U	4.0 P	34 J	16 P	37 U	40 U	38 U
Endosulfan Sulfate	39 U	3.7 U	3.6 U	3.9 RU	3.7 U	37 U	40 U	38 U
4,4'-DDT	260	3.7 U	8.7	17.0 JP	34 P	58 JP	49 P	110 J
Methoxychlor	200 U	19 U	18 U	20 RU	19 U	190 U	210 U	200 U
Endrin Ketone	39 U	3.7 U	3.6 U	3.9 RU	3.7 U	37 U	40 U	38 U
Endrin Aldehyde	39 U	3.7 U	3.6 U	11 JP	5.3 P	37 U	40 U	38 U
Alpha-Chlordane	20 U	1.9 U	7.8 P	2.2 JP	1.9 U	19 U	310 PC	20 U
Gamma-Chlordane	20 U	1.9 U	4.5 P	2.9 JP	1.9 U	19 U	500 PC	20 U
Toxaphene	2000 U	190 U	180 U	200 RU	190 U	1900 U	2100 U	2000 U
Aroclor-1016	390 U	37 U	36 U	39 RU	37 U	370 U	400 U	380 U
Aroclor-1221	790 U	76 U	73 U	79 RU	74 U	760 U	820 U	770 U
Aroclor-1232	390 U	37 U	36 U	39 RU	37 U	370 U	400 U	380 U
Aroclor-1242	390 U	37 U	36 U	39 RU	37 U	370 U	400 U	380 U
Aroclor-1248	390 U	37 U	36 U	39 RU	37 U	370 U	400 U	380 U
Aroclor-1254	390 U	37 U	36 U	39 RU	27 U	370 U	400 U	380 U
Aroclor-1260	390 U	37 U	36 U	39 RU	130	370 U	400 U	380 U

Inorganic Analysis for Soil Samples
Cottage Grove Landfill

Metals and Cyanide	Sample Locations and Number Concentrations in mg/kg							
	SS01	SS02	SS03	SS04	SS05	SS06	SS07 Background	SS08 Background
Aluminum	9750	7480	12800	12200	5650	13700	10200	4680
Antimony	5.7 RUN	5.5 RUN	5.2 RUN	5.2 RUN	5.3 RUN	5.5 RUN	5.7 RUN	5.4 RUN
Arsenic	11.3	4.6	7.5	6.0	9.6	10.9	8.9	7.3
Barium	72.4	52.9	68.2	70.7	81.7	114	84.2	44.2 B
Beryllium	0.69 B	0.86 B	0.94 B	0.69 B	0.24 B	0.69 B	0.45 B	0.23 U
Cadmium	2.6	0.68 U	0.65 U	0.65 U	2.0	3.5	1.2	1.3
Calcium	47100 J	93400 J	59800 J	49600 J	14500 J	32100 J	15000 J	15700 J
Chromium	52.6 *	15.9 *	18.7 *	25.3 *	18.5 *	66.1 *	27.2 *	12.4 *
Cobalt	9.3 B	4.8 B	8.9 B	8.0 B	13.6	8.8 B	7.0 B	4.6 B
Copper	44.0	13.6	20.3	29.8	21.8	65.5	27.1	18.1
Iron	14900	9220	17300	15400	15300	24700	15000	9260
Lead	55.3 JE	16.0 JE	23.3 JE	98.2 JE	71.1 JE	196 JE	87.6 JE	67.4 JE
Magnesium	26500 J	47900 J	27700 J	25000 J	7540 J	15400 J	7800 J	8350 J
Manganese	563 *	940 *	514 *	415 *	855 *	1070 *	453 *	232 *
Mercury	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	0.23	0.12 U	0.11 U
Nickel	46.1	20.6	24.2	22.0	21.9	30.5	16.4	7.3 B
Potassium	1760	1160	2800	3310	1400	3200	1960	865 B
Selenium	0.94 U	0.91 U	0.87 U	0.87 U	0.88 U	0.92 U	1.2 B	0.90 U
Silver	1.9 U	1.8 U	1.7 U	1.7 U	1.8 U	1.8 U	1.9 U	1.8 U
Sodium	261 UJB	389 UJB	359 UJB	343 UJB	275 UJB	761 UJB	281 UJB	244 UJB
Thallium	1.7 U	1.6 U	1.5 U	1.5 U	1.5 U	1.6 U	1.7 U	1.6 U
Vanadium	21.6	15.6	25.8	25.8	18.8	41.6	29.4	13.7
Zinc	123 JE	29.4 UJE	53.4 UJE	119 JE	425 JE	355 JE	283 JE	123 JE
Cyanide	0.59 U	0.57 U	0.54 U	0.58 U	0.61 U	0.83	0.59 U	0.56 U

soilmet

Volatile Organic Analysis for Groundwater/Residential Well Samples Cottage Grove Landfill			
Volatile Compound	Sample Locations and Number Concentrations in ug/L		
	RW01	GW02 Background	GW03
Chloromethane	1 U	10 U	10 U
Bromomethane	1 U	10 U	10 U
Vinyl Chloride	1 U	10 U	10 U
Chloroethane	1 U	10 U	10 U
Methylene Chloride	2 UJB	10 UJB	10 UJB
Acetone	5 UJB	10 UJ	10 UJ
Carbon Disulfide	1 UJB	10 U	10 U
1,1-Dichloroethene	1 U	10 U	10 U
1,1-Dichloroethane	1 U	2 J	10 U
Trans-1-2-Dichloroethene	1 U	Not Analyzed	Not Analyzed
cis-1,2-Dichloroethene	1 U	Not Analyzed	Not Analyzed
1,2-Dichloroethene (total)	Not Analyzed	10 U	10 U
Chloroform	1 U	10 U	10 U
1,2-Dichloroethane	1 U	10 U	10 U
2-Butanone	5 UB	10 UJ	10 UJ
1,1,1-Trichloroethane	1 U	10 U	10 U
Carbon Tetrachloride	1 U	10 U	10 U
Bromodichloromethane	1 U	10 U	10 U
1,2-Dichloropropane	1 U	10 U	10 U
cis-1,3-Dichloropropene	1 U	10 U	10 U
Trichloroethene	1 U	10 U	10 U
Dibromochloromethane	1 U	10 U	10 U
1,1,2-Trichloroethane	1 U	10 U	10 U
Benzene	1 U	10 U	10
trans-1,3-Dichloropropene	1 U	10 U	10 U
Bromoform	1 U	10 U	10 U
4-Methyl-2-Pentanone	5 U	10 U	10 U
2-Hexanone	5 U	10 U	10 U
Tetrachloroethene	1 U	10 U	10 U
1,1,2,2-Tetrachloroethane	1 U	10 U	10 U
Toluene	1 UB	10 U	10 U
Chlorobenzene	1 U	10 U	1 J
Ethylbenzene	1 U	10 U	10 U
1,2-Dibromo-3-chloropropane	1 U	Not Analyzed	Not Analyzed
Styrene	1 U	10 U	10 U
Xylene (total)	1 U	10 U	2 J
1,2-Dibromoethane	1 U	Not Analyzed	Not Analyzed
1,2-Dichlorobenzene	1 U	Not Analyzed	Not Analyzed
1,2-Dichlorobenzene	1 U	Not Analyzed	Not Analyzed
1,3 Dichlorobenzene	1 U	Not Analyzed	Not Analyzed
Total Number of TICS *	0	1	4

* Number, not concentrations, of tentatively identified compounds (TICs). gw-volat

Volatile Organic Analysis for Groundwater/Residential Well Samples Tentatively Identified Compounds Cottage Grove Landfill Concentrations in ug/L		
Compound Name	Retention Time	Estimated Concentration
Sample GW02		
Unknown	2.78	9 J
Sample GW03		
Unknown	2.78	1 J
Unknown	3.27	6 J
Unknown Silica	3.95	12 J
Furan, Tetrahydro	6.25	30 JN

tic-v

Semivolatile Organic Analysis for Groundwater/Residential Well Samples Cottage Grove Landfill			
Semivolatile Compound	Sample Location and Number Concentrations in ug/L		
	RW01	GW02 Background	GW03
Phenol	5 U	10 U	10 U
bis(2-Chloroethyl)Ether	5 U	10 U	10 U
2-Chlorophenol	5 U	10 U	10 U
1,3-Dichlorobenzene	Not Analyzed	10 U	10 U
1,4-Dichlorobenzene	Not Analyzed	10 UJ	4 J
1,2-Dichlorobenzene	Not Analyzed	10 U	10 U
2-Methylphenol	5 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	5 U	10 U	10 U
4-Methylphenol	5 U	10 U	10 U
n-Nitroso-Di-n-Propylamine	5 U	10 U	10 U
Hexachloroethane	5 U	10 U	10 U
Nitrobenzene	5 U	10 U	10 U
Isophorone	5 U	10 U	10 U
2-Nitrophenol	5 U	10 U	10 U
2,4-Dimethylphenol	5 U	10 U	10 U
bis(2-Chloroethoxy)Methane	5 U	10 U	10 U
2,4-Dichlorophenol	5 U	10 U	10 U
1,2,4-Trichlorobenzene	5 U	10 U	10 U
Naphthalene	5 U	10 U	4 J
4-Chloroaniline	5 U	10 U	10 U
Hexachlorobutadiene	5 U	10 U	10 U
4-Chloro-3-Methylphenol	5 U	10 U	10 U
2-Methylnaphthalene	5 U	10 U	10 U
Hexachlorocyclopentadiene	5 U	10 U	10 U
2,4,6-Trichlorophenol	5 U	10 U	10 U
2,4,5-Trichlorophenol	20 U	25 U	25 U
2-Chloronaphthalene	5 U	10 U	10 U
2-Nitroaniline	20 U	25 U	25 U
Dimethyl Phthalate	5 U	10 U	10 U
Acenaphthylene	5 U	10 U	10 U
2,6-Dinitrotoluene	5 U	10 U	10 U
3-Nitroaniline	20 U	25 U	25 U
Acenaphthene	5 U	10 U	10 U
2,4-Dinitrophenol	20 U	25 U	25 U
4-Nitrophenol	20 U	25 U	25 U
Dibenzofuran	5 U	10 U	10 U
2,4-Dinitrotoluene	5 U	10 U	10 U
Diethylphthalate	5 U	10 U	10 U
4-Chlorophenyl-phenylether	5 U	10 U	10 U

Semivolatile Organic Analysis for Groundwater/Residential Well Samples Cottage Grove Landfill			
Semivolatile Compound	Sample Location and Number Concentrations in ug/L		
	RW01	GW02 Background	GW03
Fluorene	5 U	10 U	10 U
4-Nitroaniline	20 UJ	25 U	25 U
4,6-Dinitro-2-Methylphenol	20 U	25 U	25 U
n-Nitrosodiphenylamine	5 U	10 U	10 U
4-Bromophenyl-phenylether	5 U	10 U	10 U
Hexachlorobenzene	5 U	10 U	10 U
Pentachlorophenol	20 U	25 U	25 U
Phenanthrene	5 U	10 U	10 U
Anthracene	5 U	10 U	10 U
Carbazole	Not Analyzed	10 UJ	10 UJ
di-n-Butylphthalate	5 UB	10 U	10 U
Fluoranthene	5 U	10 U	10 U
Pyrene	5 U	10 U	10 U
Butylbenzylphthalate	5 UJ	10 U	10 U
3,3'-Dichlorobenzidine	5 UJ	10 U	10 U
Benzo(a)Anthracene	5 U	10 U	10 U
Chrysene	5 U	10 U	10 U
bis(2-Ethylhexyl)Phthalate	5 UJB	10 UJB	10 UJB
di-n-Octyl Phthalate	5 U	10 U	10 U
Benzo(b)Fluoranthene	5 U	10 U	10 U
Benzo(k)Fluoranthene	5 U	10 U	10 U
Benzo(a)Pyrene	5 U	10 U	10 U
Indeno(1,2,3-cd)Pyrene	5 U	10 U	10 U
Dibenzo(a,h)Anthracene	5 U	10 U	10 U
Benzo(g,h,i)Perylene	5 U	10 U	10 U
Total Number of TICs *	0	9	22

* Number, not concentration, of tentatively identified compounds (TICs). gw-semiv

Semivolatile Organic Analysis for Groundwater/Residential Well Samples Tentatively Identified Compounds Cottage Grove Landfill Concentrations in ug/L		
Compound Name	Retention Time	Estimated Concentration
Sample GW02		
Unknown carboxylic acid	11.42	J
2H-AZEP In-2-One, 6-amino	12.02	JN
Unknown Hydrocarbon	12.22	J
Unknown	13.72	J
Unknown	13.90	J
Fatty acid	18.13	J
Unknown alcohol	19.48	J
Fatty acid	19.63	J
Unknown	20.90	J
Sample GW03		
Unknown	10.28	J
Unknown	10.68	J
Unknown	10.97	J
Unknown	11.1	J
Unknown	11.22	J
Benzothiazole	11.45	JN
Unknown	12.08	J
Unknown	12.18	J
2H-AZEP in 2-One, hexahydro	12.37	JN
Unknown	12.92	J
Unknown	13.42	J
Unknown	14.08	J
Unknown	14.43	J
Unknown	15.25	J
Unknown	16.03	J
Benzothiazolone	16.20	J
Benzothiazolone	16.42	J
Unknown	16.87	J
Unknown	19.20	J
Unknown	19.65	J
Unknown	21.38	J
Unknown	21.60	J

tic-sv

Pesticide/PCB Analysis for Groundwater/Residential Well Samples Cottage Grove Landfill			
Pesticide/ PCB	Sample Locations and Number Concentrations in ug/L		
	RW01	GW02 Background	GW03
Alpha-BHC	0.010 U	0.050 UJ	0.050 UJ
Beta-BHC	0.010 U	0.050 UJ	0.050 UJ
Delta-BHC	0.010 U	0.050 UJ	0.050 UJ
Gamma-BHC (Lindane)	0.010 U	0.050 UJ	0.050 UJ
Heptachlor	0.010 U	0.050 UJ	0.050 UJ
Aldrin	0.010 U	0.050 UJ	0.050 UJ
Heptachlor Epoxide	0.010 U	0.050 UJ	0.050 UJ
Endolsulfan I	0.010 U	0.050 UJ	0.050 UJ
Dieldrin	0.020 U	0.10 UJ	0.10 UJ
4,4'-DDE	0.020 U	0.10 UJ	0.10 UJ
Endrin	0.020 U	0.10 UJ	0.10 UJ
Endosulfan II	0.020 U	0.10 UJ	0.10 UJ
4,4'-DDD	0.020 U	0.10 UJ	0.10 UJ
Endosulfan Sulfate	0.020 U	0.10 UJ	0.10 UJ
4,4'-DDT	0.020 U	0.10 UJ	0.10 UJ
Methoxychlor	0.10 U	0.50 UJ	0.50 UJ
Endrin Ketone	0.020 U	0.10 UJ	0.10 UJ
Endrin Aldehyde	0.020 U	0.10 UJ	0.10 UJ
Alpha-Chlordane	0.010 U	0.050 UJ	0.050 UJ
Gamma-Chlordane	0.010 U	0.050 UJ	0.050 UJ
Toxaphene	1.0 U	5.0 UJ	5.0 UJ
Aroclor-1016	0.20 U	1.0 UJ	1.0 UJ
Aroclor-1221	0.40 U	2.0 UJ	2.0 UJ
Aroclor-1232	0.20 U	1.0 UJ	1.0 UJ
Aroclor-1242	0.20 U	1.0 UJ	1.0 UJ
Aroclor-1248	0.20 U	1.0 UJ	1.0 UJ
Aroclor-1254	0.20 U	1.0 UJ	1.0 UJ
Aroclor-1260	0.20 U	1.0 UJ	1.0 UJ

gw-pest

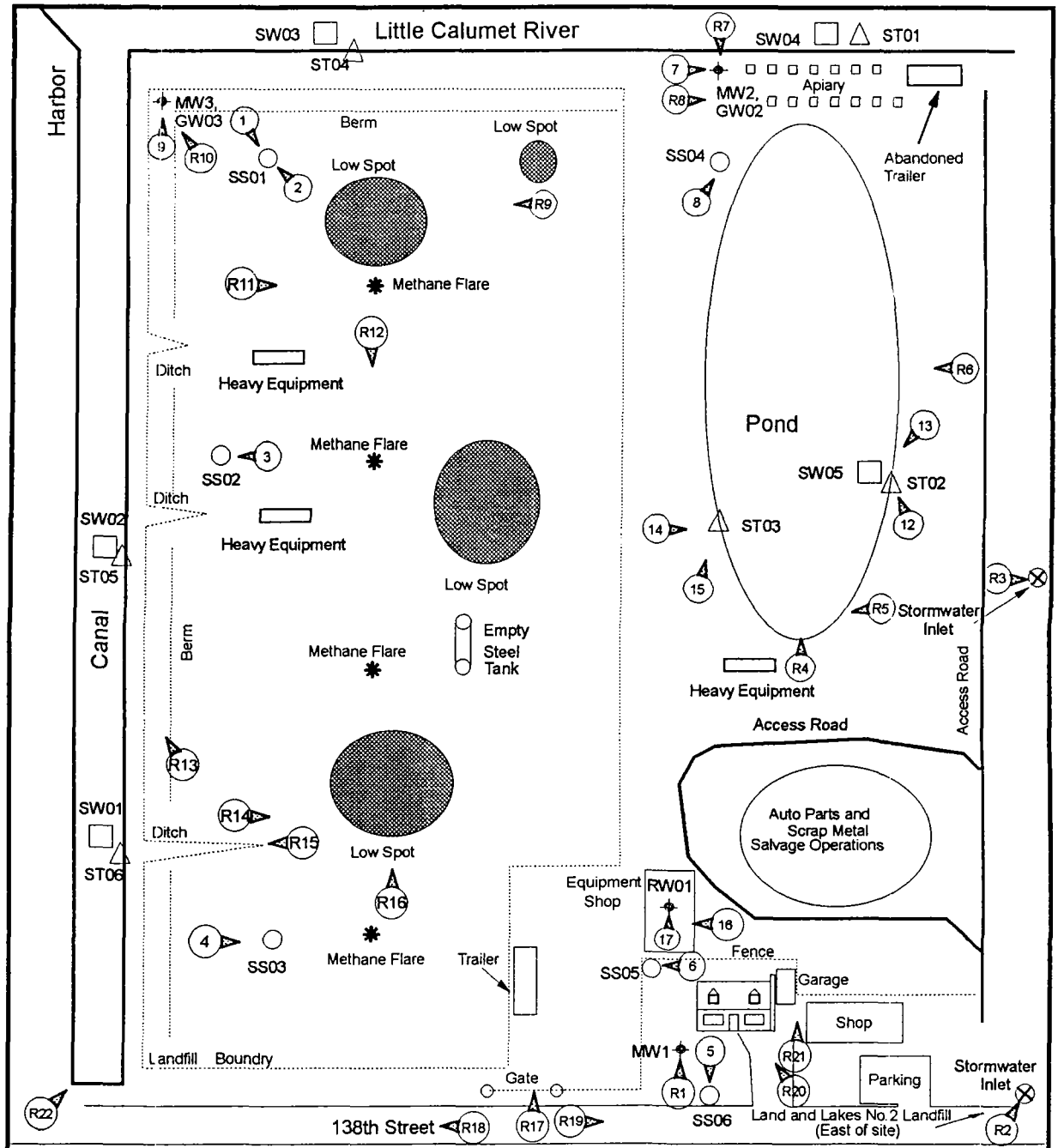
Inorganic Analysis for Groundwater/Residential Well Samples Cottage Grove Landfill			
Metals and Cyanide	Sample Locations and Number Concentrations in ug/L		
	RW01	GW02 Background	GW03
Aluminum	31.0 U	41.0 U	70.9 B
Antimony	48.0 U	24.0 U	24.0 U
Arsenic	12.2	9.5 B	6.8 B
Barium	6.3 B	67.7 B	593
Beryllium	1.0 U	1.0 U	1.0 U
Cadmium	0.10 U	3.0 U	3.0 U
Calcium	15100	240000	158000
Chromium	10.0 U	5.0 U	12.7
Cobalt	10.0 U	5.0 U	5.0 U
Copper	9.6 B	6.0 U	6.0 U
Iron	74.9 JB	36800 J	10100 J
Lead	3.5 JS	3.0 U	3.0 U
Magnesium	3440	95200	290000
Manganese	2.0 U	702	131
Mercury	0.20 U	0.20 U	0.20 U
Nickel	16.0 U	21.0 U	42.8
Potassium	3650	17900	198000
Selenium	1.7 B	4.0 U	4.0 U
Silver	4.0 U	8.0 UJN	8.0 UJN
Sodium	113000 JN	78500 J	826000 J
Thallium	2.0 US	7.0 U	7.0 U
Vanadium	7.0 U	6.0 U	6.0 U
Zinc	68.3	24.6 J*	7.0 UJ*
Cyanide	10.0 UJN	20.7	10.0 U

gwmetals

Appendix D

Cottage Grove Landfill

Site Photographs



FRE00093 9/29/94

Date: 04/28/93

Time: 1040

Photo Taken By: W. Gregson

Photo Number: R1

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: North

Description: View of monitoring well #1, located in front yard of onsite private home.

Date: 04/28/93

Time: 1043

Photo Taken By: W. Gregson

Photo Number: R2

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: Northeast

Description: Stormwater inlet located at the southeastern corner of the Cottage Grove site (L&L #2 Landfill in background).

Date: 04/28/93

Time: 1050

Photo Taken By: W. Gregson

Photo Number: R3

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: East

Description: Land & Lakes #2 stormwater inlet, located at the midsection of the Cottage Grove eastern border.

Date: 04/28/93

Time: 1052

Photo Taken By: W. Gregson

Photo Number: R4

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: North

Description: View of the onsite pond from the south end.

Date: 04/28/93

Time: 1053

Photo Taken By: W. Gregson

Photo Number: R5

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: West

Description: View of the southwestern corner of the onsite pond.

Date: 04/28/93

Time: 1055

Photo Taken By: W. Gregson

Photo Number: R6

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: West

Description: Elevation of the landfill from the east side of the pond.

Date: 04/28/93

Time: 1100

Photo Taken By: W. Gregson

Photo Number: R7

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: South

Description: Monitoring well #2 near the northwestern corner of the onsite pond.

Date: 04/28/93

Time: 1101

Photo Taken By: W. Gregson

Photo Number: R8

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: East

Description: Northern border of the site and the adjacent Little Calumet River, includes honeybee apiary area with trailer located at northeastern corner of site.

Date: 04/28/93

Time: 1102

Photo Taken By: W. Gregson

Photo Number: R9

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: West

Description: Small wet area on top of the northern section of the landfill.

Date: 04/28/93

Time: 1106

Photo Taken By: W. Gregson

Photo Number: R10

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: Northwest

Description: Photo of monitoring well #3, located near the northwestern corner of the landfill, adjacent to river and harbor.

Date: 04/28/93

Time: 1108

Photo Taken By: W. Gregson

Photo Number: R11

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: East

Description: Top of the landfill, showing a gas vent, scrap materials, and ponded water. Note L & L #2 in background.

Date: 04/28/93

Time: 1110

Photo Taken By: W. Gregson

Photo Number: R12

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: South

Description: Top of the landfill. Note the ga vents and abandoned heavy equipment.

Date: 04/28/93

Time: 1115

Photo Taken By: W. Gregson

Photo Number: R13

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: Northwest

Description: Western border of the landfill and adjacent canal and harbor.

Date: 04/28/93

Time: 1117

Photo Taken By: W. Gregson

Photo Number: R14

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: East

Description: Possible leachate seep along the midsection of the western slope of the landfill.

Date: 04/28/93

Time: 1118

Photo Taken By: W. Gregson

Photo Number: R15

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: West

Description: Ditch formed by runoff erosion along western slope.

Date: 04/28/93

Time: 1125

Photo Taken By: W. Gregson

Photo Number: R16

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: North

Description: Top of the landfill, showing gas vent and abandoned heavy equipment.

Date: 04/28/93

Time: 1127

Photo Taken By: W. Gregson

Photo Number: R17

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: North

Description: Front gate at entrance to landfill.

Date: 04/28/93

Time: 1128

Photo Taken By: W. Gregson

Photo Number: R18

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: East

Description: Photo of the landfill site at 138th street. There is a ditch between the road and the southern slope of the landfill.

Date: 04/28/93

Time: 1130

Photo Taken By: W. Gregson

Photo Number: R19

Locaton/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: East

Description: Ditch along 138th Street running east away from front entrance to landfill. The Land and Lakes No. 2 landfill is in the background.

Date: 04/28/93

Time: 1132

Photo Taken By: W. Gregson

Photo Number: R20

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: Northwest

Description: Onsite house.

Date: 04/28/93

Time: 1133

Photo Taken By: W. Gregson

Photo Number: R21

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: North

Description: Scrap automobiles, tree line, and trailer at southern portion of site.

Date: 04/28/93

Time: 1149

Photo Taken By: W. Gregson

Photo Number: R22

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: Northeast

Description: Photo of southwestern section of landfill, taken from 138th Street entrance to Pier 11 Marina.

Date: 08/17/93

Time: 1450

Photo Taken By: W. Gregson

Photo Number: 1

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: Southeast

Description: Soil Sample SS01 collected approximately 60 feet directly southeast of monitoring well MW03, near the northwestern corner of the site.

Date: 08/17/93

Time: 1453

Photo Taken By: M. Casserly

Photo Number: 2

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: Northwest

Description: General location of soil sample SS01 with shovel and cooler just behind sample spot and monitoring well MW03 and recreational harbor in background.

Date: 08/17/93

Time: 1518

Photo Taken By: W. Gregson

Photo Number: 3

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: West

Description: Soil Sample SS02 collected approximately 180 feet west of the second methane gas vent from the north end of landfill. Sample jars and HNu PID equipment to the right of sample location.

Date: 08/17/93

Time: 1556

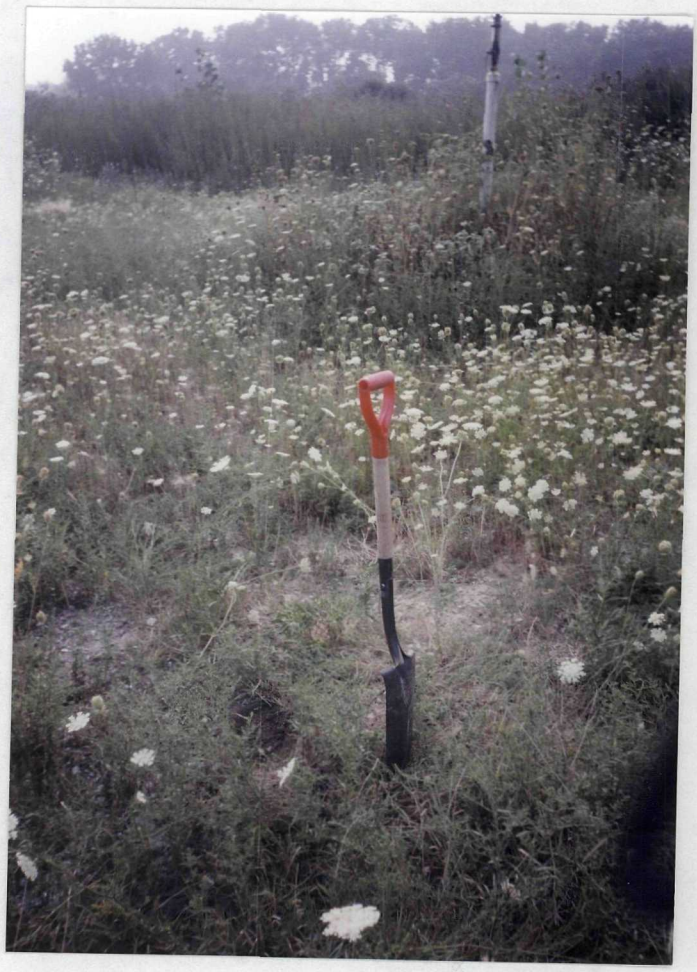
Photo Taken By: W. Gregson

Photo Number: 4

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: East

Description: Soil sample SS03 collected approximately 50 feet west of the south most methane gas vent with shovel right of the sample spot and gas vent in background.



Date: 08/17/93

Time: 1705

Photo Taken By: W. Gregson

Photo Number: 5

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: South

Description: Soil sample SS06 collected from front yard of onsite residence (approximately 20 feet north of 138th Street).

Date: 08/17/93

Time: 1715

Photo Taken By: W. Gregson

Photo Number: 6

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: West

Description: Soil sample SS05 collected in backyard of onsite residence, approximately 30 feet north of the NW corner of the house.

Date: 08/17/93

Time: 1737

Photo Taken By: W. Gregson

Photo Number: 7

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: East

Description: Monitoring well MW02 with honeybee apiary and an abandoned trailer in the background.

Date: 08/17/93

Time: 1750

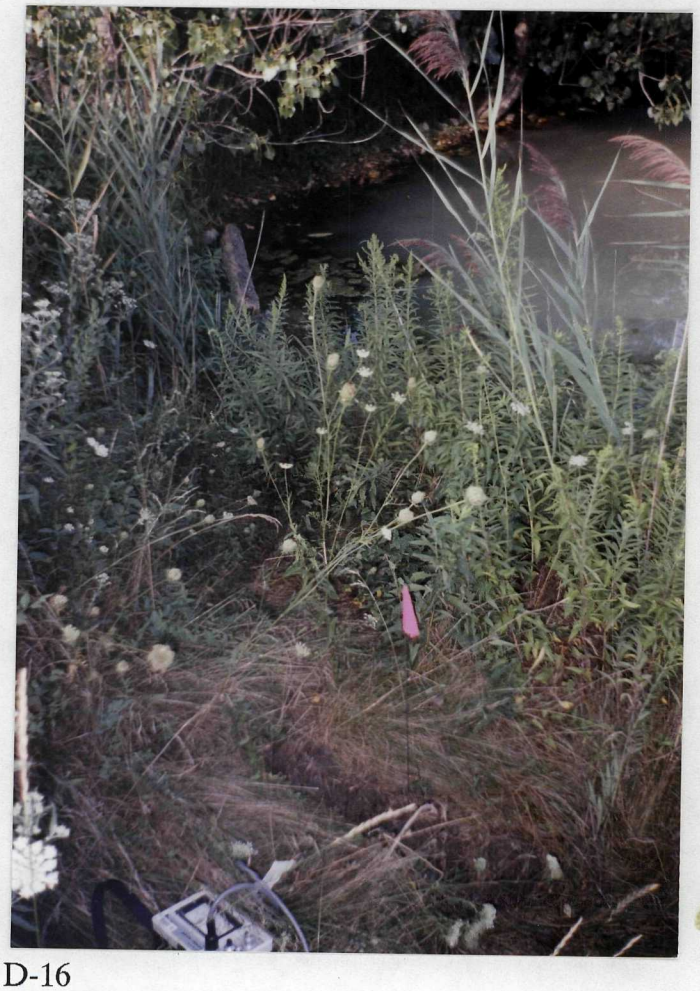
Photo Taken By: W. Gregson

Photo Number: 8

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: Northeast

Description: Soil sample SS04 collected near the northwestern corner of the site pond. A red flag on a two-foot wire post marks the sampling spot (approximately 50 feet south of monitoring well MW02).



Date: 08/17/93

Time: 1810

Photo Taken By: W. Gregson

Photo Number: 9

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: North

Description: View of monitoring well MW03 with the Little Calumet River in the background.

Date: 08/17/93

Time: 1835

Photo Taken By: Bal Berena

Photo Number: 10

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: East

Description: Location of Soil sample SS07 taken offsite, south of 138th Street near a glass recycling plant. A chain link fence is right of the sample spot which is marked by a sampling spoon.

Date: 08/17/93

Time: 1846

Photo Taken By: Bal Berena

Photo Number: 11

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: East

Description: Location of background soil sample SS08. The sample was collected at the corner of Cottage Grove Avenue and Shepard Drive about 1 mile south of Cottage Grove Landfill. A spoon marks the sample spot and the bottom of a tree trunk is in the background.

Date: 08/18/93

Time: 1035

Photo Taken By: W. Gregson

Photo Number: 12

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: Northwest

Description: Location of ST02 and SW05 which were collected on the eastern bank of the onsite pond (approximately 220 feet north of the southern end of the pond).

Date: 08/18/93

Time: 1036

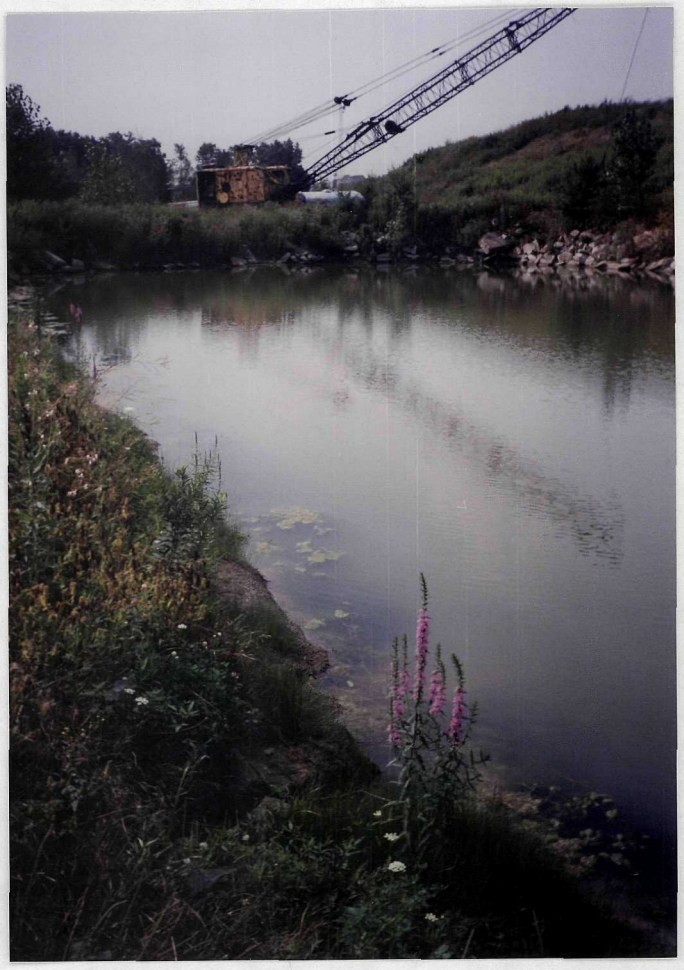
Photo Taken By: W. Gregson

Photo Number: 13

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: Southwest

Description: View of the southern portion of the onsite pond from the location of ST02 and SW05.



Date: 08/18/93

Time: 1110

Photo Taken By: W. Gregson

Photo Number: 14

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: East

Description: Location of sediment sample ST03 along the western bank of onsite pond.

Date: 08/18/93

Time: 1112

Photo Taken By: W. Gregson

Photo Number: 15

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: Northeast

Description: View of the northern portion of the onsite pond from the location of ST03.

Date: 08/18/93

Time: 1124

Photo Taken By: W. Gregson

Photo Number: 16

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: West

Description: Garage where the onsite private/residential well is located.

Date: 08/18/93

Time: 1125

Photo Taken By: W. Gregson

Photo Number: 17

Location/ILD #: Cottage Grove Landfill
ILD 980 497 747

Direction of Photo: North

Description: Residential well and pump.